

SMART LEARNING ENVIRONMENT SYSTEM:

E-Commerce Module

ABSTRACT

ACKNOWLEDGEMENT

by

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1 SAW YUEN MENG @ CHUA YUEN MENG

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CHAPTER 2 REVIEW OF LITERATURE

2.1 Purpose

2.2 Approach

2.3 Results

This project is submitted to the Faculty Of Computer Science
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CHAPTER 3 METHODOLOGY

3.1 Project Description

3.2 Approach

3.3 Justification

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TABLE OF CONTENTS

ABSTRACT	v
ACKNOWLEDGEMENT	vi
LIST OF FIGURES	vii
LIST OF TABLES	x
CHAPTER 1 INTRODUCTION	1
1.1 Objectives	1
1.2 Scope And Limitations	2
1.3 Significance	3
CHAPTER 2 REVIEW OF LITERATURE	
2.1 Purpose	4
2.2 Approach	4
2.3 Findings	5
2.4 Analysis	17
2.4.1 Strength And Weakness Of Proposed Tools	20
CHAPTER 3 METHODOLOGY	
3.1 Project Description	23
3.2 Approach	25
3.3 Justification	26

3.4	Development Strategy	27
3.5	Proposed Tools	29
3.6	System Design	32
3.6.1	Data Flow Diagram (DFD)	35
3.6.2	Examples Of Screen Designs	47
3.7	Statement Of Expected Outcome	50

CHAPTER 4 SYSTEM IMPLEMENTATION

4.1	System Setup	51
4.1.1	Database Design	52
4.2	System Testing	56
4.2.1	Unit Testing	56
4.2.1.1	Review/Examining The Code	56
4.2.1.2	Using Test Cases For Testing	57
4.2.1.3	System Testing By Other Users	57
4.2.2	Integration Testing	58

CHAPTER 5 PROJECT FINDINGS AND CONCLUSION

5.1	System Evaluation	59
5.1.1	System Strength	59
5.1.2	System Limitation	60
5.2	Future Enhancement	61
5.3	Problems Encountered	62

5.4 Conclusion	63
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APPENDICES

References	64
Project Schedule	65
User Manual	66
Source Code	110

This proposal is fully concentrated on building a system for the ordering and purchasing of learning materials for web-based courses. The main objective and significance of the system is to be easily integrated in the Smart Learning Environment System. The learning materials here are computer-related books. The system is also known as E-Commerce Module and is divided into 2 modules: Customer Module and Admin Module. Customer Module itself is also divided into 5 more modules, there are Order Module, Review Module, Search Module, Register Module and Login Module. While the Admin Module is where all the administrative work is conducted such as deleting, editing and adding new material into the system. It also contain 4 more modules called Edit Item Module, Edit Review Module, Edit Member Module, Report Module and lastly Category Module.

The approached in building the system is based on prototyping and the tools and software that were used to build the system is based on the Open Source concept that is software that are freely distributed. The software that were used to realized this system are Java, MySQL database, Linux Operating System and Apache Web Server.

ABSTRACT

Smart Learning Environment System is a system that allows the maintaining and distribution of course materials via the web, administering and grading test for web-based courses, facilitates multilevel threaded discussions among student to student or student to lecturer, manages the system and databases for the web-based courses and streamlines the ordering and purchasing of learning materials for web-based courses.

This proposal is fully concentrated on building a system for the ordering and purchasing of learning materials for web-based courses. The main objective and significant of the system is to be easily integrated in the Smart Learning Environment System. The learning materials here are computer related books. The system is also known as E-Commerce Module and is divided into 2 modules, Consumer Module and Admin Module. Consumer Module itself is also divided into 5 more modules, there are Order Module, Review Module, Search Module, Register Module and Login Module. While the Admin Module is where all the administrative work is conducted such as deleting, editing and adding new material into the system. It also consist 4 more modules called Edit Item Module, Edit Review Module, Edit Member Module, Report Module and lastly Category Module.

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LIST OF FIGURES

1.	Figure 3.1:	Steps In Prototyping	25
2.	Figure 3.2:	Context Diagram Of Consumer Module	36
3.	Figure 3.3:	Figure 0 Diagram Of Consumer Module	37
4.	Figure 3.4:	Figure 1 Diagram Of Login Module	38
5.	Figure 3.5:	Figure 3 Diagram Of Register Module	38
6.	Figure 3.6:	Figure 4 Diagram Of Order Module	39
7.	Figure 3.7:	Figure 4.2 Diagram Of Place Order In Shopping Cart Module	39
8.	Figure 3.8:	Figure 5 Diagram Of Review Module	40
9.	Figure 3.9:	Figure 6 Diagram Of Search Module	41
10.	Figure 3.10:	Context Diagram Of Admin Module	42
11.	Figure 3.11:	Figure 0 Diagram Of Admin Module	43
12.	Figure 3.12:	Figure 4 Diagram Of Edit Item Module	44
13.	Figure 3.13:	Figure 5 Diagram Of Edit Review Module	45
14.	Figure 3.14:	Figure 6 Diagram Of Edit Member Module	45
15.	Figure 3.15:	Figure 7 Diagram Of Report Module	46
16.	Figure 3.16:	Figure 8 Diagram Of Logout Module	46
17.	Figure 3.17:	Figure 9 Diagram Of Edit Category Module	47
18.	Figure 3.18:	Admin Login Page	48
19.	Figure 3.19:	Admin Add Item Page	49

20.	Gantt Chart showing the duration of each task in preparing the proposal	65
21.	Gantt Chart showing the duration of each task in implementing the system	65
22.	Admin Login Page	66
23.	Wrong Password Or Username Or Both Error Page	68
24.	User Has Already Login Error Page	69
25.	Admin Main Page	71
26.	Monthly Report Page	72
27.	Yearly Report Page	73
28.	Member Yearly Report Page	74
29.	Member Monthly Report Page	75
30.	Add New Book Page	76
31.	Stocks Listings Page	78
32.	Edit Book Page	79
33.	Add Review Page	80
34.	Add Stock Page	81
35.	Add Stock Confirm Page	82
36.	List Approved Reviews Page	83
37.	List Unapproved Reviews Page	84
38.	Edit Review Page	85
39.	Category Listing Page	86
40.	Edit Category Page	87
41.	Members Listing Page	88

42.	Edit Member Page	89
43.	Change Administrator Password Page	90
44.	Outstanding Order(s) Page	91
45.	Splash Page	92
46.	Registration Page	93
47.	Member Login Page	94
48.	Member's Personal Information Page	95
49.	Edit Member's Particulars Page	96
50.	Member's Current Order Page	97
51.	Book Order History Page	98
52.	Consumer Main Page	99
53.	Display The Latest Book Page	100
54.	Example Of Search By Title Page	101
55.	Shopping Cart Page	103
56.	Payment Method Page	104
57.	Error While Filling In Payment Details Page	105
58.	Display Purchase ID Page	106
59.	Option To Relogin Or Cancel Order Page	107
60.	Book Description Page	108
61.	Add Review Page	109

LIST OF TABLES

1.	Table 2.1:	Linux's Strength And Weakness	20
2.	Table 2.2:	Windows NT's Strength And Weakness	20
3.	Table 2.3:	Servlet/JSP's Strength And Weakness	20
4.	Table 2.4:	ASP's Strength And Weakness	21
5.	Table 2.5:	MySQL's Strength And Weakness	22
6.	Table 2.6:	Microsoft SQL Server 7.0's Strength And Weakness	22
7.	Table 2.7:	Apache Web Server's Strength And Weakness	22
8.	Table 3.1:	Description Of Symbols Used In Gane-Sarson DFD	35
9.	Table 4.1:	Listing Of Hardware And Software Used	51
10.	Table 4.2:	Data Type Description	53
11.	Table 4.3:	Admin Table	53
12.	Table 4.4:	Book Table	54
13.	Table 4.5:	Category Table	54
14.	Table 4.6:	Credit_Card Table	54
15.	Table 4.7:	Members Table	54
16.	Table 4.8:	Orders Table	55
17.	Table 4.9:	Reviews Table	55

INTRODUCTION

Every web site or dot com site in the internet now a days need only one thing to keep thriving for success, that is the ability to dynamically deliver goods, information and services. In short able to link and communicate with consumers, suppliers and organization. This is done by electronic transaction and electronically exchanging information. All in all, this is the essence of E-Commerce.

Categories or segments of E-Commerce are a plenty such as banking and finance, retail and travel. This proposal is fully concentrated on the retail site of E-Commerce, that is selling and ordering of learning materials via the web. Sites such as www.amazon.com and www.mphponline.com are sites that are now offering such services.

1.1 Objectives:

- To be able to easily integrate into the Smart Learning Environment System.
- To be able to be a stand alone system beside being able to integrate into the Smart Learning Environment System.
- Able to provide easy navigation and a good graphical user interface for consumer to browse and shop.
- Allow the flexibility, ease and another alternative of searching and ordering books via the web beside the usual way of driving down to the nearest book store.

- The system also allows the flexibility to add, delete and edit items into the existing environment. This task is solely reserved for the administrator to do. Administrator in this sense refers to those who manages the system.
- To allow ease of adding new modules into the existing system, such as introducing a module for free email services and so on.
- To introduced a cheaper alternative for new entrepreneurs who have the intention to build their own E-Commerce module. This project will allow them to see how and what tools are needed to be an effective, small, cheap and stable E-Commerce site.

1.2 Scope And Limitation:

- The system employed a virtual database that contains a limited set of credit numbers. It is used to validate credit cards that were submitted by the consumers. All the credit credits numbers in the database are created for the purpose of testing.
- Internet security is beyond the scope of this proposal.
- All pricing that are listed is in Ringgit Malaysia (RM) only.
- The learning materials or items that will be used in the system are computer related books.

1.3 Significant: REVIEW OF LITERATURE

Smart Learning Environment is a system that aims to provide students the ease on studying and learning. It encourages students to be more computer and Internet literate. It allows students to check their results, class schedule, discuss tutorial with lecturer, ordering learning materials and so on via the web.

Thus the significant of this proposal is to develop the ordering of learning materials module part of the Smart Learning Environment System and then easily integrate it into the Smart Learning Environment System. Another significant of the system is that it can also be a stand- alone system if it does not integrate into the Smart Learning Environment System, thus giving this system the characteristic of flexibility.

REVIEW OF LITERATURE

2.1 Purpose:

The main purpose of this literature review is to show the reader how, where and by what way information is gathered and then compiled. It also contains an analytical view of certain information and resources.

2.2 Approach:

All information was found and collected through the Internet search engines and also from certain books. The search engines that were used are:

- www.altavista.com
- www.google.com
- www.infoseek.com
- www.yahoo.com

The main reason why these search engines were used is because of their popularity. But after using all of the search engines, it was found that www.google.com has the edge over the others because of its simplicity, accuracy and its speed of retrieving the search results.

All the search results that were returned were articles, newsletters, messages from newsgroups, software development sites and so on. To get the appropriate materials, each material was reviewed one at a time. This of course will take up a lot of time but it will guarantee that the right material is correctly retrieved. Sometimes steps have to be taken to narrow down the search because sometimes search results will return more materials that are actually quite redundant. To do this most search engines have a

features called "exclude phrase or keyword ", the symbol for it is "- phrase" or "- keyword".

Keywords used for the findings:

- "e-commerce" or "ecommerce"
- "online payment method"
- "online secure payment service"
- "online credit card payment"
- "Server side programming"
- "Java vs ASP" or "Java versus ASP"
- "MySQL"
- "linux vs NT" or "linux versus NT"

2.3 Findings:

The findings can be separated into categories: *E-Commerce, Online Payment Method, Web Security and Development Tools.*

E-Commerce [1,2,8]

Electronic Commerce or E-Commerce is more than businesses selling to consumers via a Web store. Rather, E-Commerce is a set of dynamic technologies, applications and business processes that link organizations, customers, suppliers and communities through electronic transactions and the electronic exchange of information, products and services.

E-Commerce includes:

- Industry-specific E-Commerce such as home-banking or stock-trading in financial services, on-line reservations and ticket purchase in travel services, or selling information content and digital goods in the publishing and software industries.

- Cross-industry E-Commerce which refers to generic E-Commerce, is applicable to a wide variety of industries. This includes corporate intranets, supply-side E-Commerce, demand-side E-Commerce and customer service. Corporate intranets refer to intra-enterprise back-office applications such as accounting, finance, manufacturing and human resources deployed using internet technology.

Examples of supply-side E-Commerce include on-line procurement of production

and non-production goods, trading networks and supply-side management.

Examples of demand-side E-Commerce include business-to-business and business-to-consumer on-line sales, demand capture for production planning and consumer trading through bidding and auction. Examples of customer service include on-line self-service, Electronic Bill Presentment and Customer Relationship Management.

- Business-to-business transactions using Electronic Data Interchange (EDI). Many businesses are using the Internet for communication or using Web forms to initiate transactions.

E-Business can be used interchangeable with E-Commerce. It allows business to operate 24-hours a day and it reaches out globally no matter where customers are staying. There are various issues that are concerned about E-Commerce, such as the best payment methods that are available, security issue and so forth. E-Commerce allows consumers to shop from their house and make various payments with ease. Thus

it ease the consumers the pain of going out of the house to and drive to the nearest shopping mall and then look for parking space to do their shopping. It opens the door for small independent business to grow and not being bullied by the big conglomerate or organization. This is because anyone can easily set up an E-Commerce site to gain capital. All it needs is a third party software to help build the site for the novice non computer savvy people or for those who are DIY (Do It Yourself) type and with some programming back ground, there are lots of programming language that can support their needs.

Amazon.com and MPH.com [13,14]

This 2 site are some of the e-commerce sites that are on the web. The primary objectives of these 2 sites that were built was to allow consumers to view and buy books and magazines via the web. Its payment methods are primary using credit cards. Beside this it also offers other services such as selling CD-ROM or providing free email to its members. One of the features that both has is shopping cart. Shopping cart is a concept that allows consumers to add, edit and delete the items that desired. It allows instant viewing of items that were selecting and also instant discarding of goods that are later not desired.

Online Payment Method

In every e-commerce site, the one thing that is one of the most important is the manner of transaction. To provide instance transactions, online payment is introduced. Below are some of the payment methods that were researched and reviewed on.

Credit Card

When a consumer makes a purchase in Internet, the consumer has to fill in a form that request for the customer's credit card. After receiving this, the merchant will verify the credibility of the credit card by checking with the financial institution that issues the credit card. When all validation is correct than the consumer account will be debit and the merchant is paid, goods will then be sent to consumer.

Ecash and NetCash [3]

Both uses electronic cash to do transactions. The electronic cash that is used is called digital coins. There are three main entities that makes Ecash system work:

- Banks who produced digital coins, validate existing coins and exchange real money for Ecash.
- Consumers who have accounts with a bank, from which they can withdraw and deposit Ecash coins.
- Merchants who can accept Ecash coins in payment for information or goods.

The difference between this two are that Ecash uses electronic cash that is untraceable while NetCash uses identified coins but it is scalable and more secured.

Money Order

Payment is sent by postal to the merchant when consumer orders some particular goods in the Internet. After merchant received the payment then it will only send the goods to the consumer. This whole process might take a week or weeks.

Web Security

When talking about transaction, security issue comes into the picture. Security is one of the fundamental reasons why people make transactions online. If an e-commerce site can provide a good security, it will give consumers the sense of security to make transactions via the web. Below are some of the reviews on types of web security.

SET [4]

SET (Secure Electronic Transaction) is a system for ensuring the security of financial transactions on the Internet. It is supported initially by Mastercard, Visa, Microsoft, Netscape, and others. With SET, a user is given an electronic wallet (digital certificate) and a transaction is conducted and verified using a combination of digital certificates and digital signatures among the purchaser, a merchant, and the purchaser's bank in a way that ensures privacy and confidentiality. SET makes use of Netscape's

Secure Sockets Layer (SSL), Microsoft's Secure Transaction Technology (STT), and Terisa System's Secure Hypertext Transfer Protocol (S-HTTP). SET uses some but not all aspects of a public key infrastructure (PKI). The objective of SET (Secure Electronic Transaction) is to provide:

- confidentiality of information
- ensure payment integrity
- authenticate both merchants and cardholders

This specification will enable greater payment card acceptance, with a level of security that will encourage consumers and businesses to make wide usage of payment card products. It guarantees secured transmission of importance documents and also transaction between consumers and merchants. It transmits data outside of the usual HTTP (Hyper Text Transfer Protocol) network.

SSL [5]

SSL (Secure Sockets Layer) is a program layer created by Netscape for managing the security of message transmissions in a network. Netscape's idea is that the programming for keeping your messages confidential ought to be contained in a program layer between an application (such as your Web browser or HTTP) and the Internet's TCP/IP layers. The "sockets" part of the term refers to the sockets method of passing data back and forth between a client and a server program in a network or between program layers in the same computer.

HTTPS [5]

HTTPS (Secure Hypertext Transfer Protocol) is a Web protocol developed by Netscape and built into its browser that encrypts and decrypts user page requests as well as the pages that are returned by the Web server. HTTPS is really just the use of Netscape's Secure Socket Layer (SSL) as a sub layer under its regular HTTP application layer. (HTTPS uses port 443 instead of HTTP port 80 in its interactions with the lower layer, TCP/IP).

PGP [5]

PGP (Pretty Good Privacy) is a popular program used to encrypt and decrypt e-mail over the Internet. It can also be used to send an encrypted digital signature that lets the receiver verify the sender's identity and know that the message was not changed en route. Available both as freeware and in a low-cost commercial version, PGP is the most widely used privacy-ensuring program by individuals and is also used by many corporations. Developed by Philip R. Zimmermann in 1991, PGP has become a de facto standard for e-mail security. PGP can also be used to encrypt files being stored so that they are unreadable by other users or intruders. For sending digital signatures, PGP uses an efficient algorithm that generates a hash code from the user's name and other signature information. This hash code is then encrypted with the sender's private key. The receiver uses the sender's public key to decrypt the hash code. If it matches the hash code sent as the digital signature for the message, then the receiver is sure that the message has arrived securely from the stated sender. PGP's RSA version uses the MD5

algorithm to generate the hash code. PGP's Diffie-Hellman version uses the SHA-1 algorithm to generate the hash code.

Development Tools

The development tools are separated into *programming language, database, web server and operating system*. *Programming language* will be the first part to look at. These are some of the tools that are used to realize an e-commerce site.

Programming Language:

Java [9]

It is a platform independent programming language, because of its portability it has emerge as one of the most widely language in the commercial market. Its popularity also can be contributed to the fact that it is free for anyone to download and used. Java is an Object Oriented Programming language. One of its main strength is its reusability where classes that were created once can use for many times without the need to rewrite the same classes. Java is an interpreted language therefore it is freed from some of the concerns of intermodule dependencies. It also support multiple, synchronized threads where an application can run a few task at the same time. Besides this it is also very robust in the sense that memory management has been simplified and also it uses runtime garbage collection instead of explicit freeing of memory. Because it is dynamic, Java environment can extend itself by linking in classes that may be located on remote

servers on a network (for example, the Internet). This is a tremendous advantage over a language like C++ that links classes in prior to runtime.

Servlets/Java Server Pages (JSP) [9,11]

Servlets technology is primary designed for use with the HTTP protocol of the World Wide Web. Servlets are Java application components that are downloaded on demand to the part of the system that needs them. It is effective for developing Web-based solutions that help provide secure access to a Web site, that interact with databases on behalf of a client, that dynamically generate custom HTML documents to be displayed by browsers and that maintain unique session information for each client.

JSP (Java Server Pages) is part of the Java family therefore it has the all the features of Java such as platform independent and reusability. JSP allows Web developers and designers to rapidly develop and easily maintain, information-rich, dynamic Web pages that leverage existing business systems. JSP technology is an extension of the Java Servlet API. Servlets are platform-independent, 100% pure Java server-side modules that fit seamlessly into a web server framework and can be used to extend the capabilities of a web server with minimal overhead, maintenance and support.

Active Serve Pages (ASP) [5]

An ASP (Active Server Page) is an HTML page that includes one or more scripts (small embedded programs) that are processed on a Microsoft Web server before

the page is sent to the user. An ASP is somewhat similar to a server-side include or a common gateway interface (CGI) application in that all involve programs that run on the server. Typically, the script in the Web page at the server uses input received as the result of the user's request for the page to access data from a database and then builds or customizes the page on the fly before sending it to the person that request it. It is a feature of the Microsoft Internet Information Server (IIS), but, since the server-side script is just building a regular HTML page, it can be delivered to almost any browser.

Database:

MySQL [6]

It is a relational database where data are store in separate tables rather than putting all the data in one big storeroom. This adds speed and flexibility. The tables are linked by defined relations making it possible to combine data from several tables on request. MySQL is open source software, which means that it is possible to use and modify for anyone. Anybody can download MySQL from the Internet and use it without paying anything.

Microsoft SQL Server 7.0 [15]

Microsoft SQL Server is a relational database engine that is available for the Windows NT platform. It is a true database server system – as opposed to the file-based system used by the Jet database. This gives it vastly increased power, scalability and robustness advantage over Jet. The biggest advantage of using SQL Server is that it

supports access to its data via a resource manager. The resource manager will support the maintenance of durable data – which means that any changes made to the database system during a transaction will be automatically reversed if the transaction does not complete successfully.

Web Server:

Apache Web Server [10]

It is a very powerful, flexible and HTTP/1.1 compliant web server that implements the latest protocols, including HTTP/1.1 (RFC2616). Apache also allows customization by writing 'modules' using the Apache module API hence the phrase it is also known for its highly configurable and extensible with third party modules. The most attractive of all are that it is free, open source and runs on Windows NT/9x, Netware 5.x, OS/2, and most versions of Unix as well as Linux.

Operating System (OS):

Linux [5]

Linux is a free operating system whereby there is not a need to pay any fees to get the operating system. It is derived from Unix and was developed by Linus Torvalds at the University of Helsinki in Finland. To complete the operating system, Torvalds and other team members made use of system components developed by members of the Free Software Foundation for the GNU project. Unlike Windows NT Linux source code

is freely available for anyone to download and modified. Linux is a multi-user operating system, where one machine is capable of allowing multiple logons with each user having more than one program active at the same time. There are currently many distributors who have packaged versions of Linux to suit customer, the distributors are RedHat, Caldera, SuSe, BeOS and many more. Linux provides a lot of services to users such as web server, ftp server, data server and so forth. What's more, majority of these are free.

Windows NT [5]

Windows NT is the Microsoft Windows personal computer operating system designed for users and businesses needing advanced capability. Windows NT, which may originally have stood for "New Technology," although Microsoft doesn't say, is actually two products: Microsoft NT Workstation and Microsoft NT Server. The Workstation is designed for users, especially business users, who need faster performance and a system a little more fail-safe than Windows 95 and Windows 98. The Server is designed for business machines that need to provide services for LAN-attached computers. The Server is required, together with an Internet server such as Microsoft's Internet Information Server (IIS), for a Windows system that plans to serve Web pages. It provides a whole lot of infrastructure technologies free that reduce the incremental work needed to add features to the site: ASP, COM, the service/event monitoring/performance monitoring stuff, ADO for ad hoc admin and reporting tools and so on.

2.4 Analysis:

E-Commerce has shot up to become the most talk about topic in town during this current time. It is because it gives businesses no matter small or big the alternative or opportunity to grasp a giant share of revenue. But to some, E-Commerce is just a business venture that is suitable for the big organization because to them the cost of building an E-Commerce site is very high. But this notion is totally wrong because there exist plenty of third party organization that can provide E-Commerce solutions with minimum of investment.

Then there's the issue of payment. Consumers do not trust or do not have the sense of security to make an online purchase. The reasons are that they do not fully understand how transactions are conducted, they also believe that there is a lack of security against fraud namely credit card fraud and what are the most secured choice of online payment method to choose from. To generally summarize, there exists Ecash, NetCash, credit card, money order and so on methods of making a payment. But of the lot money order is the most inconvenience and unreliable method because it takes time for the money to be processed and it does not guarantee that money will be sent to the appropriate because it can be lost during the delivery processed. While Ecash and NetCash have its pros and cons, it still does provides some inconvenience to the consumers because it requires each consumer to preinstalled a so-called "cyberwallet" software and also they must make sure that their bank have the services of issuing digital coins for transactions.

Security comes into the picture when talking about the technical aspect of E-Commerce. The methods that are currently using to ensure that transactions is not easily being tampered is by using encryption and a secured channel. There are a lot of different types of encryption such as PGP (Pretty Good Encryption) and RSA and IDEA to name a few. Secured channel means that only those who have special privileges can use the channel while others are not allowed to use it. This way it will prevent hackers from trying to steal important data. The components that makes a channel secured are SET, SSL, HTTPS and so on. With these in used, data integrity will be ensured.

Another technical of -Commerce is the development tools, tools that are use to build a successful E-Commerce site. Development tools can be divided into Microsoft products and free open source products. From the findings it can be seen that software and OS that are free and open source posses a lot of advantages namely Linux, Java, Apache Web Server and MySQL compare to the commercially available tools, namely Microsoft products and Oracle. But then again for Microsoft and Oracle to survived until today and becoming the standard in the world is just not merely pure luck. The reason is simple, it has wide commercial support and thus people especially those who are new to the computer world will feel much safer and have a sense of security while using the products. It also provides great but expensive technical support. But for the benefit of the small to medium scale businesses, free and open source tools is the most appropriate choice because it is less costly and is comparatively quite stable. Then again if an entrepreneur who chooses to just concentrate on handling the business aspect of

their E-Commerce then third party E-Commerce solution is the obvious choice for them.

Table 2.1: Linux's Strength And Weakness

Finally to conclude the analysis, it has to be said that software that are based on the free open source concept is gaining popularity. And it might one day dethrone the Microsoft's controlled software world.

Supports multi-user	GUI interface is still not user friendly enough
Open source, where its code is freely available	Harder to learn for beginner
Stable, available and reliable	Lacks commercial software support
It does not need to be reformat when some hardware or software failed	Missing many powerful software to build a real application
Easier to upgrade a system that is based on Linux in terms of hardware that it using	Not safe because all machines have the same Linux security hole
Its multi-processing capabilities is excellent	

Table 2.2: Windows NT's Strength And Weakness

Strength	Weakness
Point and click interface, easy for beginner to learn	Not very stable, hang more often compare to Linux
Have good technical support	Expensive due to its license and upgrades
Supports a lot of applications that is available in the market	When it hang, the whole system needs to be rebooted
Is security better than other OS	Need to pay license, around US\$300
Microsoft's strength is its many crying eyes	Not very easy to maintain NT when telnet from a remote site because remote access is a hassle
	Its multi-processing capabilities is only modest

Table 2.3: Servlet/JSP's Strength And Weakness

Strength	Weakness
Platform independent, therefore can be run in any platform	Need to have basic knowledge in Java before one can start coding in JSP

2.4.1 STRENGTH AND WEAKNESS OF PROPOSED TOOLS

Table 2.1: Linux's Strength And Weakness

Strength	Weakness
It's free	Hard to get technical support
Supports multi-user	GUI interface is still not user friendly enough
Open source, where its code is freely available	Harder to learn for beginner
Stable , scalable and reliable	Lacks commercial software support
It does not need to be rebooted when some hardware or software failed	Missing many pieces or component to build a real application
Easier to upgrade a system that is based on Linux in terms of hardware that is using	Not safe because every crackers have the same Linux source code
Its multi-processing capabilities is excellent	

Table 2.2: Windows NT's Strength And Weakness

Strength	Weakness
Point and click action oriented, easy for beginner to learn	Not very stable, hang more often compare to Linux
Have good technical support	Expensive due to its license and upgrades
Supports a lot of application that is available in the market	When it hang, the whole system needs to be rebooted
In security sense it is safe because Microsoft guards NT from prying eyes	Need to pay license, around US\$300
	Not very easy to maintain NT when telnet from a remote site because remote access is a hassle
	Its multi-processing capabilities is only modest

Table 2.3: Servlets/JSP's Strength And Weakness

Strength	Weakness
Platform independent, therefore can be run in any platform	Need to have basics knowledge in Java before one can start coding in JSP

Free and does not need to pay any license	JSP only uses a subset of Java as its scripting language
Stability, scalable and robust	
Enable developers to separate the programming logic from the page design by providing components that are called from the page itself	
JSP is based on reusable cross-platform components	
JSP allows developers to extend the JSP tags in order to customize them	
There are a lot of free Java classes out there which developers can utilize without having to build a bridge or embed within something else to use	

Table 2.4: ASP's Strength And Weakness

Strength	Weakness
Easy to learn and develop	Lacks platform portability that other language has such as Java
ASP is designed to rely heavily on COM components for its extensibility. As a result, it is very easy to instantiate and use any COM component from within an ASP script	Must be run in Microsoft based platform
ASP provides built-in session management functionality that allows developers to persist data and also COM component instances like database connections for the duration of a session	Does allows developers to extend the ASP tags in order to customize them
Enable developers to separate the programming logic from the page design by providing components that are called from the page itself	
ASP can use either JavaScript or VBScript as its scripting language	

Table 2.5: MySQL’s Strength And Weakness

Strength	Weakness
Free	Not user friendly
Open Source	No graphical user interface
Fast and robust	Does not have transaction rollback
Enable developers to separate the programming logic from the page design by providing components that are called from the page itself	
ASP can use either JavaScript or VBScript as its scripting language	

Table 2.6: Microsoft SQL Server 7.0’s Strength And Weakness

Strength	Weakness
Supports transactions rollback, that is went any changes to the database will be revert back if the transaction is not successful	It must be integrated into Microsoft based products such as Microsoft NT
	It is not license free software

Table 2.7: Apache Web Server’s Strength And Weakness

Strength	Weakness
Free	Not user friendly
Open Source	No graphical user interface
Stable and have a lot of features compare to other web servers	

METHODOLOGY

3.1 Project Description

The system will be an online E-Commerce site, where anyone can browse the site and make any purchase they desire on any of the items that are on sale, namely books.

The system consists of 2 modules. There are:

- Consumer Module contains 4 more modules:
 - Order Module
 - Review Module
 - Search Module
 - Register Module
 - Login Module
- Admin Module contains 3 more modules:
 - Edit Item Module
 - Edit Review Module
 - Edit Member Module
 - Report Module
 - Category Module

Regular consumer who browse the site will be able to login (*provided that they have already registered*) into the system view and edit their own particulars and also view the items that they had bought previously. The payment method used is by using money order. Where delivery of items will only be done when the payment is received. Further

the system will allow consumer the ease of shopping by providing shopping cart that will let consumer add items that they want into the shopping cart and also delete the items that are not needed. While the administrator will have the flexibility to maintain the system via web and also manage and maintain the system and resources in an efficient way.

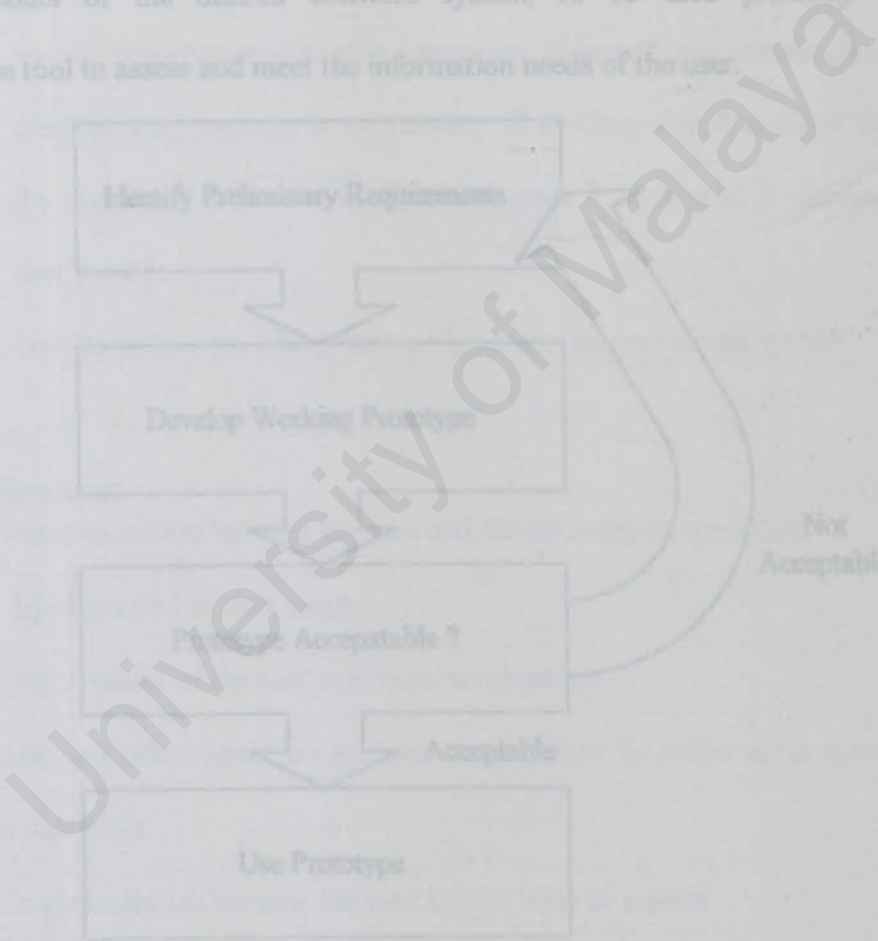


Figure 3.1: Steps In Prototyping

3.2 Approach

The *prototyping* approach was used in building the system. Prototyping is an approach which helps clarify user requirements before the design is cast in concrete. It is used as a pattern. In the computer field, prototyping refers to the process of quickly building a model of the desired software system, to be used primarily as a communication tool to assess and meet the information needs of the user.

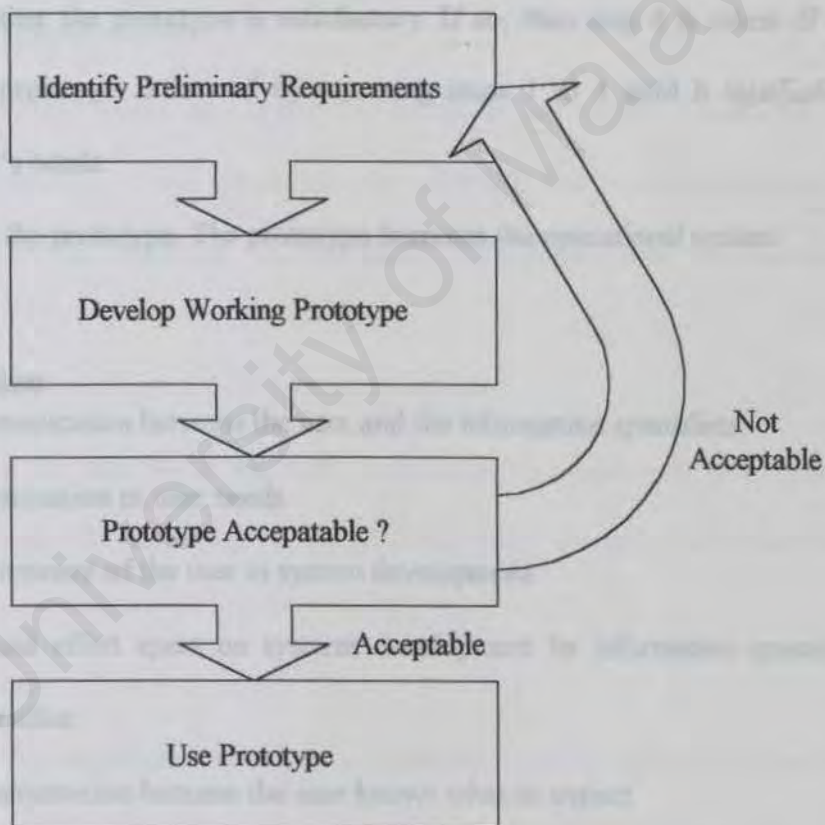


Figure 3.1: Steps In Prototyping

Prototyping Steps:

1. Identify preliminary requirements. It is where all the information regarding about the system that is to be built will be obtained.
2. Develop working prototype.
3. Determined if the prototype is acceptable. User will be asked to test and use the prototype and to give comments. User will give comments about whether the prototype is satisfactory. If so, then step 4 is taken. If not, the prototype is revised by repeating steps 1 to 3 until it satisfied the user's needs.
4. Use the prototype. The prototype becomes the operational system.

3.3 Justification

- Better communication between the user and the information specialists.
- Easier determination of user needs.
- Active involvement of the user in system development.
- Less time and effort spent on systems development by information specialists and the user alike.
- Easier implementation because the user knows what to expect.

The advantages reduce the time and costs and ensure that the systems better meet the user's needs.

3.4 Development Strategy

The system is developed first by gathering and identifying all the necessary information and data for the system such as title of books, its pricing and so on. Next the flow of the system will be developed using Gane-Sarson DFD(Data Flow Diagram). After that the database of the system will be designed.

Non-Functional Requirements

Non-functional requirement are essential definition of system properties and constraint under which a system must operate although the non-requirements are subjective. There are as important as functional requirement. The non-functional requirements are:

1) Security:

Referring to the security in the web. It includes how secure it is to transfer information via the web and so on also the issue of security in electronic transactions.

2) User interface:

It refers to the interaction between the consumer and the system. A good user interface would not deter the consumer to come back and visit the site again.

3) Response time:

It refers to how fast the system response to a users request.

4) Maintainability and expandability:

It is refers to the ease of management of the system and modification of the system at the same time.

5) *Reliability:*

The stability of the system, that is the operation of the system that runs smoothly without any clichés.

6) *Robustness:*

Refers to the quality that causes system to be able to handle or at least avoid disaster in the face of unexpected data.

Functional Requirements

Functional requirements explain interactive between system and environment through the user. The functional requirement for the system:

1) *Search:*

That is allowing the consumer and administrator to search for the items and information that they require, such as prices and personal particulars.

2) *Display result:*

Display results in the form of html pages.

3) *Add, edit or delete:*

For consumers adding, editing and deleting is done on the shopping cart or on the reviews. While for the administrator, it is done on any of the functionalities that are in the boundaries of the administrator.

3.5 Proposed Tools

The system will be built using Java as the programming language, Linux as the operating system (OS) and MySQL as the database. The reasons for these can be break into three groups, *programming language, operating system (OS), database and web server.*

Programming Language

The main reason that Java Servlet/JSP is chosen is because it is platform independent, that is it is not only cater for a particular system and it can be port to any system. Servlet/JSP is based on reusable, cross-platform components much like Java and its tags are customizable. JSP are designed to create interactive pages as part of a Web-based application and it enable developers to separate programming logic from page design through the use of components that are called from the page itself. And both provide an alternative to creating CGI scripts that makes page development and deployment easier and faster. Besides the fact it is designed to be platform independent, it is also server independent and created with input from a broader community of tool, server and database vendors. In contrast, ASP is a Microsoft technology that relies primarily on Microsoft technologies. That is the main reason why ASP is not chosen as the system's development language. Other benefits of using JSP are:

- Java language is a mature, powerful and scalable programming language that provides many benefits over the Microsoft's Basic based scripting languages.
- Example Java provides superior performance to the interpreted VBScript or JavaScript languages. Because JSP use Java technology and are compiled into

Java servlets, JSP pages provide a gateway to the entire suite of server-side Java libraries for HTTP-aware applications.

- JSP protect against system crashes.
- The Java language also helps in the area of memory management by providing protection against memory leaks and hard-to-find pointer bugs that can slow application deployment.
- It also provides the robust exception handling necessary for real-world applications.
- Servlets can be run side by side with existing Microsoft setup.

Operating System

Linux is chosen as the OS that runs the system because it is free and far more stable compare to Windows NT.

Database

The database that is chosen is MySQL. The main reason for choosing is again it is free and does not cost a cent compare to other more well known databases such as Oracle, Microsoft SQL and so on. Advantages of MySQL are:

- Fast, reliable and easy to use
- Offers a rich and very useful set of functions
- Stable and rarely get disconnected
- Get data fast

Clearly from the tools that were chosen as the development are all based on the notion of free and open source. Where there is not a need to pay any fees or license. The purpose for choosing freely available development tools is to give alternative to the up and coming entrepreneurs who have limited start up capital and who are interested to create their own E-Commerce site. The end product of the system will be enough to allow them the chance to consider using this approach in developing their own E-Commerce site.

Web Server

The web server that is chosen is Apache. The most obvious reasons for choosing Apache because it is free for download and it is widely use by everyone beside IIS (Internet Information Services) from Microsoft.

3.6 System Design

The system consists of two modules: Admin Module and Consumer Module.

Consumer Module:

- This module allows the consumer to browse and order books.
- It also allows consumer to read reviews of books and also give them the opportunity to give their own reviews.

The Consumer Module is separated into 4 more modules called Order Module, Review Module, Register Module, Search Module and Login Module. Below is some brief description of these modules:

Order Module:

- ❖ Allow consumer to browse and choose the books.
- ❖ All books that are chosen will be added to the shopping cart.
- ❖ The function of the shopping cart is to allow the consumer to view and edit their shopping list. Thus this creates flexibility and ease of shopping.
- ❖ After consumer is done shopping, their information will be submitted.
- ❖ Payments are conducted using money order. If payment is not received within one week, order will be cancelled.

Review Module:

- ❖ Allow consumer to view reviews and comments sent in by others.
- ❖ It also allows consumer to add in his or her own review.

Search Module:

- ❖ Allow consumer to search for the availability of books that they are interested.
- ❖ Consumer can search the books by publisher, title and subject.

Register Module:

- ❖ Register new member into the system.

Login Module:

- ❖ To authenticate member's username and password.
- ❖ Allow registered user to change their particulars like password, username and e-mail address.
- ❖ Allow register user to view all the items that they had previously bought.

Admin Module:

- A login page will be presented to the administrator to enter username and password. All passwords will then be encrypted and compare will the encrypted password in the database. If it is the same then the administrator will be allowed into the system to do the necessary administrative work, else an error will be prompt to the administrator to reenter the username and password again.
- If successful login, administrator can do the following tasks which is modules in itself. There are Item Module, Review Module, Member Module and Report Module.

Edit Item Module:

- ❖ Allows adding, deleting and editing items.

- ❖ Check the available or quantity of items.

Review Module:

- ❖ View all unapproved reviews.
- ❖ Edit, delete and approve unapproved reviews.
- ❖ Add reviews.

Member Module:

- ❖ View all registered member.
- ❖ Edit member's particulars. Members here are refers to consumer who has register in as a member.

Report Module:

- ❖ Print out daily report such as total daily order and the best selling book of the day.
- ❖ Administrator has the option of reading monthly and yearly report.



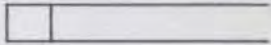
Category Module:

- ❖ Allows the administrator to list out and edit all the available category in the system.
- ❖ Administrator has the option of adding new category into the system.

- Contains a script that will check for payment. If payment for a particular item is not received within one week, order is cancel .
- All these process are done via the web.
- Objectives of the Admin Module are:

- ✓ Maintain database integrity and manage system information. It also serves the purpose of cleaning up the database such as erasing redundant data which if left unattended and the redundant data starts piling up, it will eventually jeopardize the system's efficiency.
- ✓ Keep stock all the availability of items in the system.
- ✓ Allows flexibility , where administrator can do their administrative work in any place besides at the server.

3.6.1 DATA FLOW DIAGRAM (DFD)

Symbol	Name	Description
	External entity	External entity exist outside the boundary of the system. Theses entity provides the system with input and receive the system's output. It can be a person, organization or another system.
	Process	A process is something that transforms input into output. It can be illustrated with a circle, a horizontal rectangle, or an upright rectangle with rounded corners. Each process symbol is identified with a label. The most common labeling technique is to use a verb and an object, but system or a computer system also can be used.
	Data store	A data store is a repository of data, that is to store data.


	Data flow	A data flow consists of a group of logically related data elements that travel from one point or process to another. The arrow symbol is used to illustrate the flow. It can drawn with either a straight or a curved line. A data flow consists of one or more data structures. A structure is a group of data elements that describe a particular item or transactions. It is easiest to think of a structure as the arrangement of data elements that compose a record, or as a group of related elements printed on a document.
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Table 3.1 Description Of Symbols Used In Gane-Sarson DFD

CONSUMER MODULE

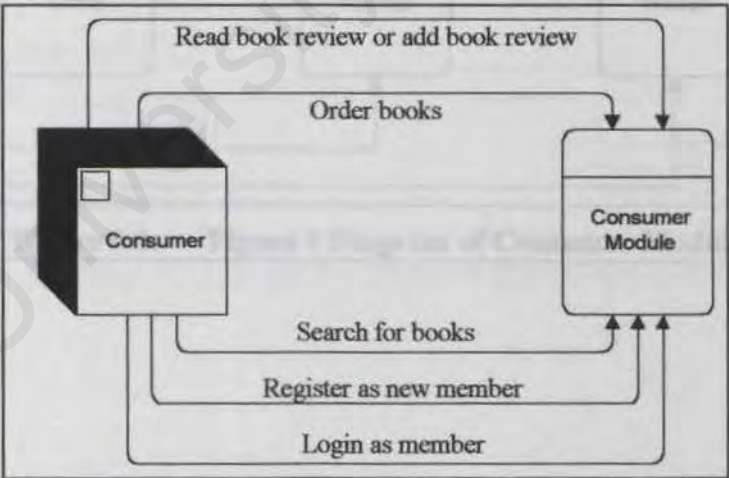


Figure 3.2: Context Diagram of Consumer Module

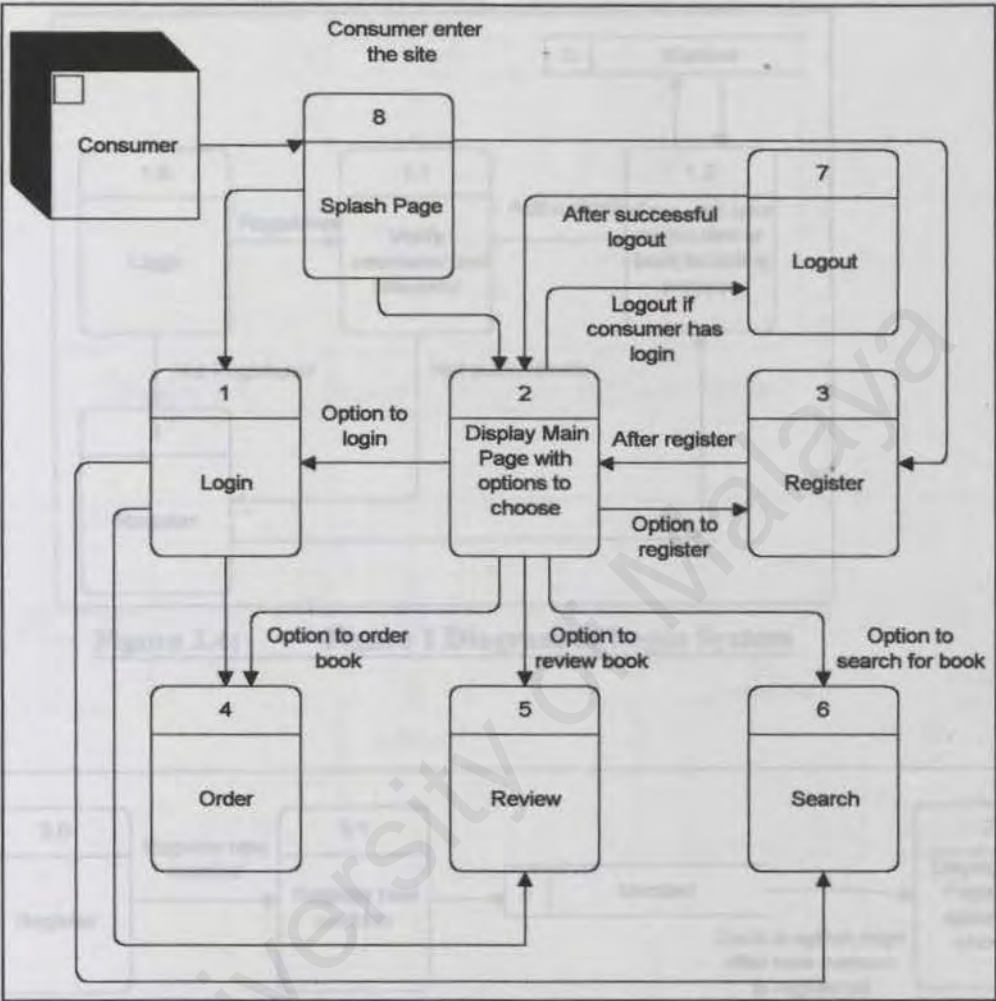


Figure 3.3: Figure 0 Diagram of Consumer Module

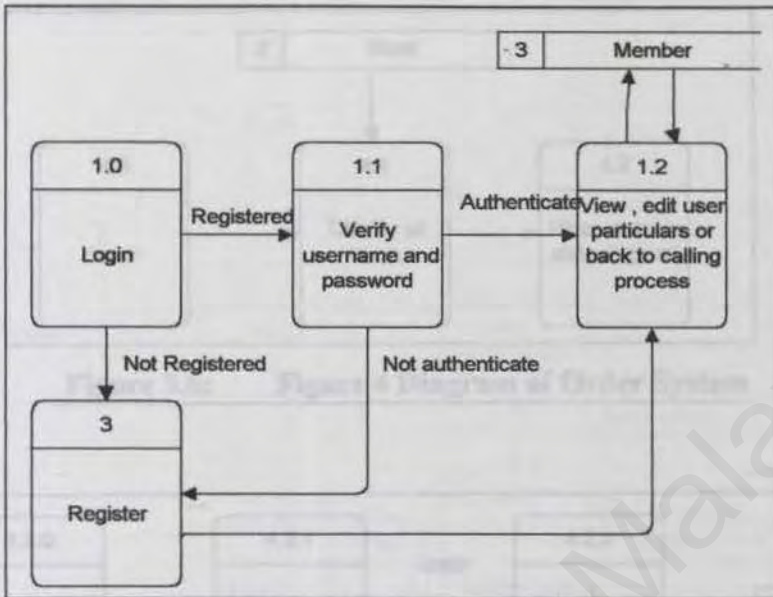


Figure 3.4: Figure 1 Diagram of Login System

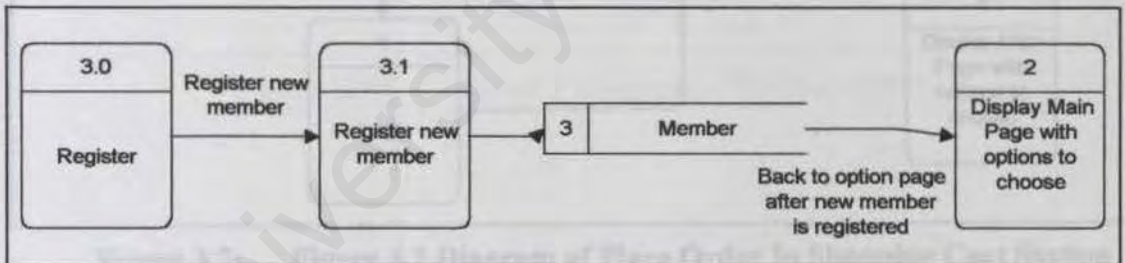


Figure 3.5: Figure 3 Diagram of Register System

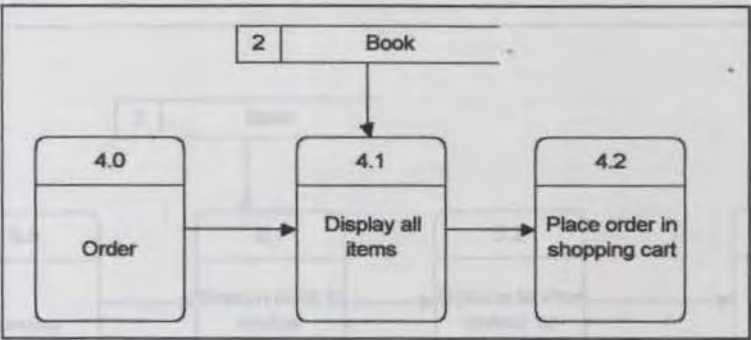


Figure 3.6: Figure 4 Diagram of Order System

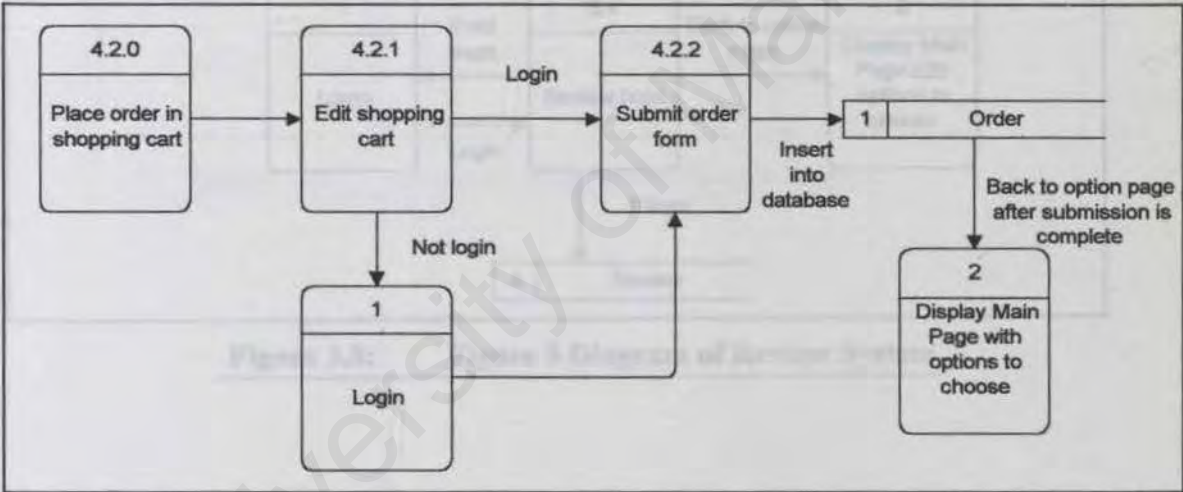


Figure 3.7: Figure 4.2 Diagram of Place Order In Shopping Cart System

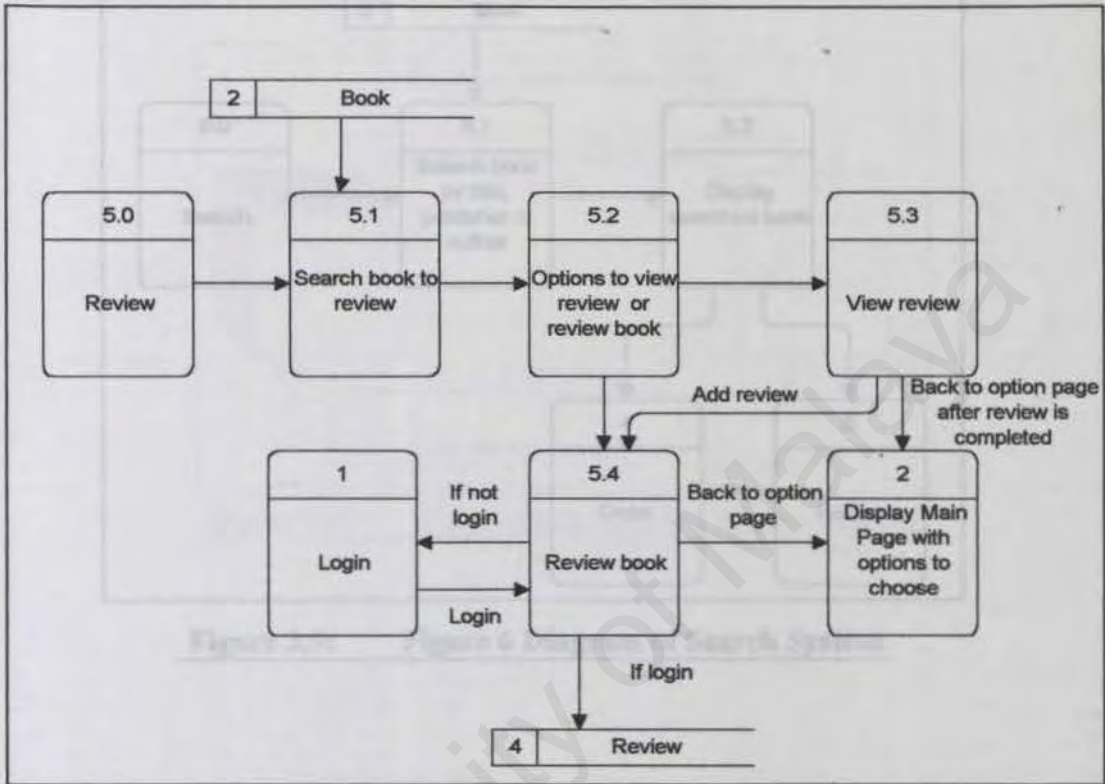


Figure 3.8: Figure 5 Diagram of Review System

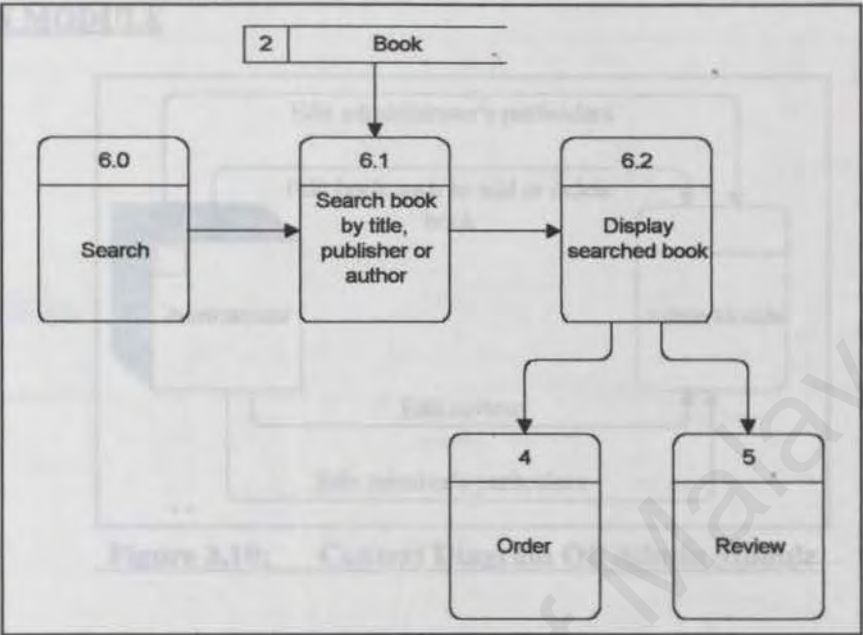


Figure 3.9: Figure 6 Diagram of Search System

ADMIN MODULE

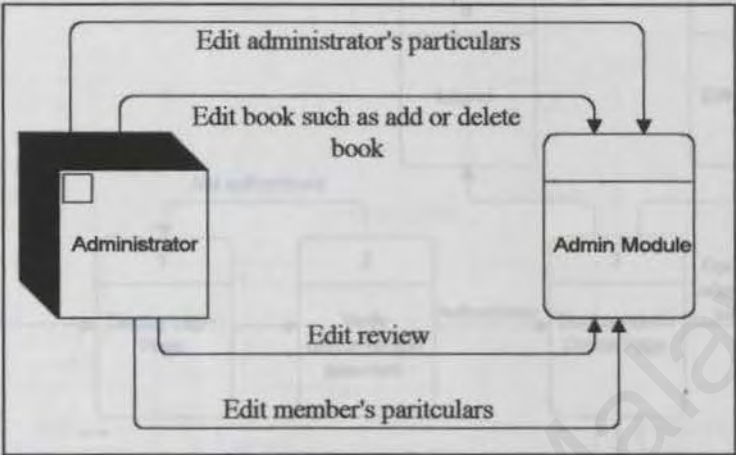


Figure 3.10: Context Diagram Of Admin Module

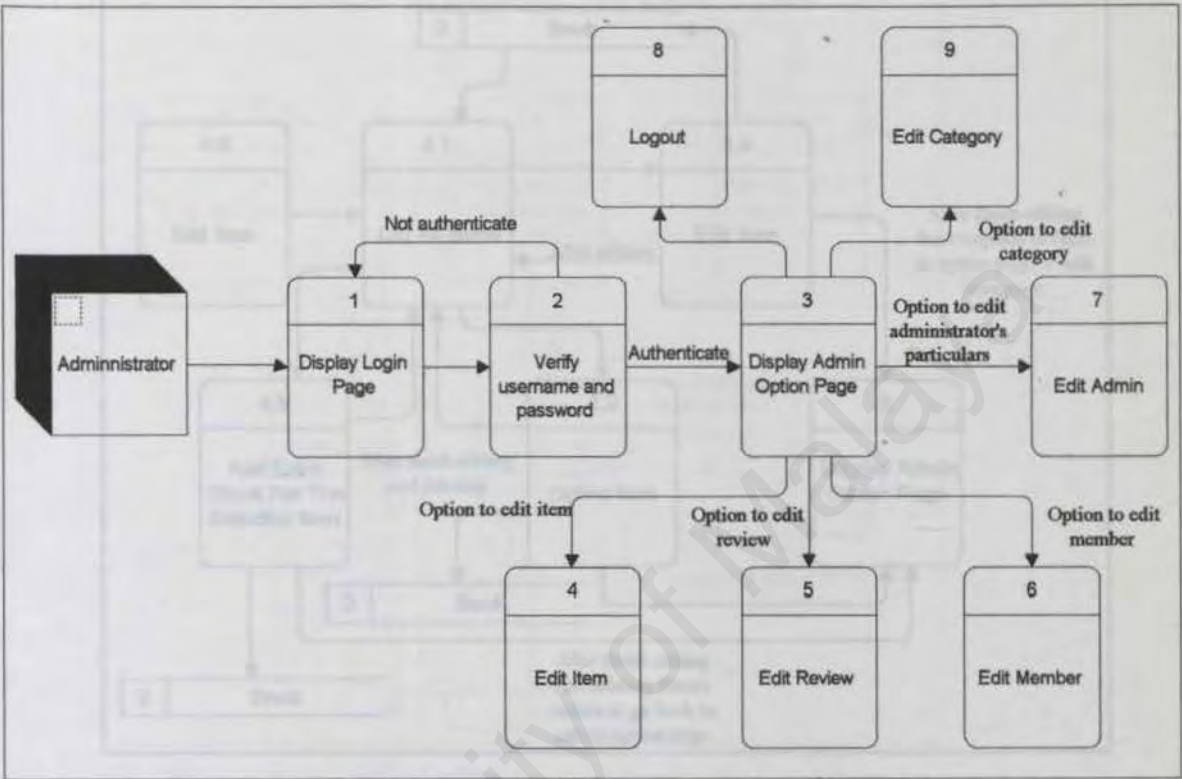


Figure 3.11: Figure 0 Diagram of Admin Module

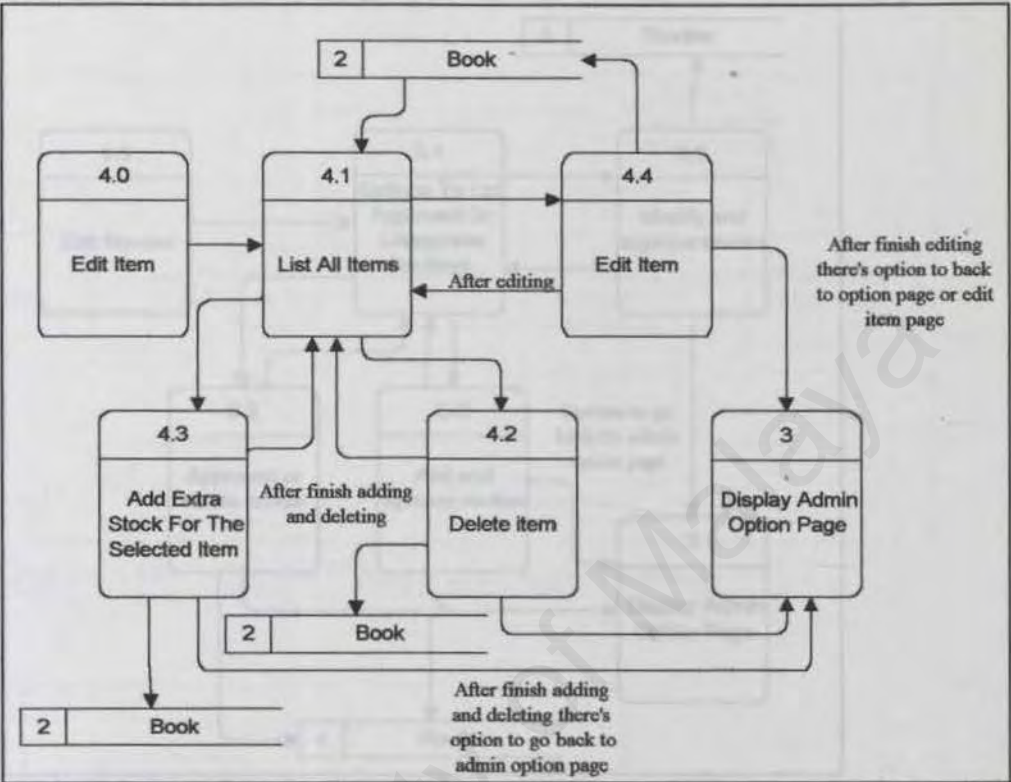


Figure 3.12: Figure 4 Diagram of Edit Item Module



Figure 3.14: Figure 4 Diagram of Edit Item Module

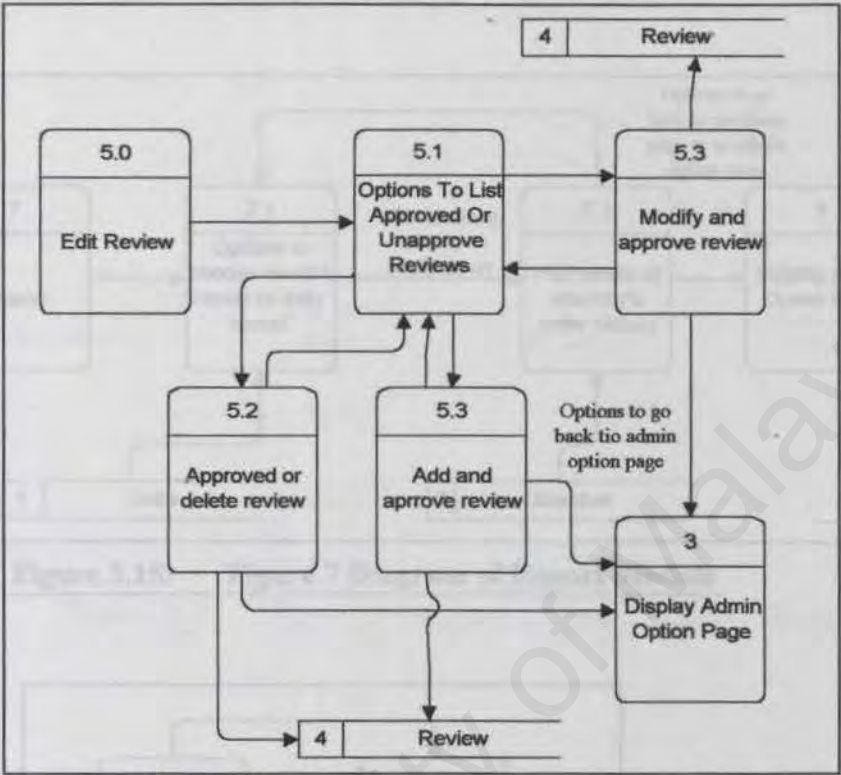


Figure 3.13: Figure 5 Diagram of Edit Review Module

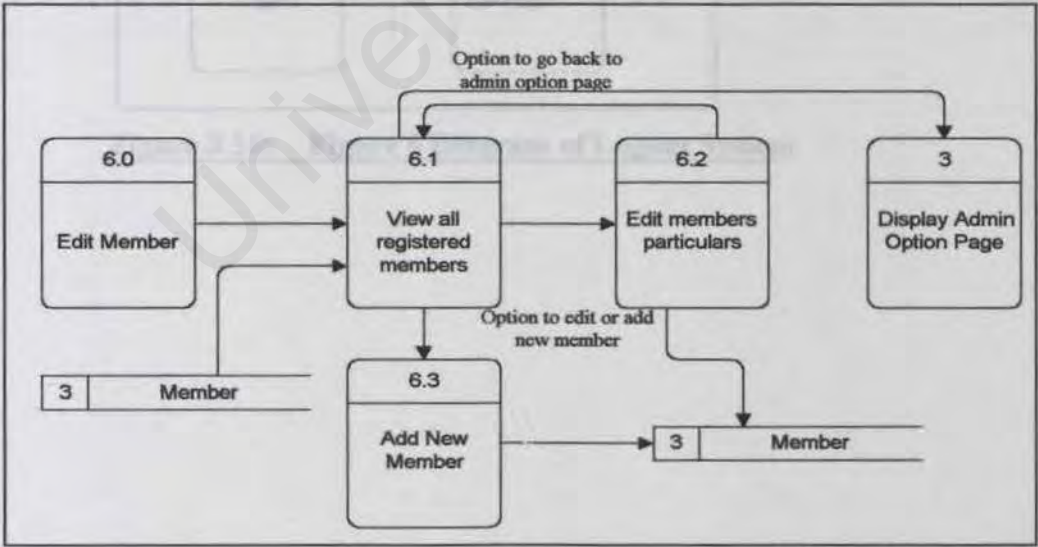


Figure 3.14: Figure 6 Diagram of Edit Member Module

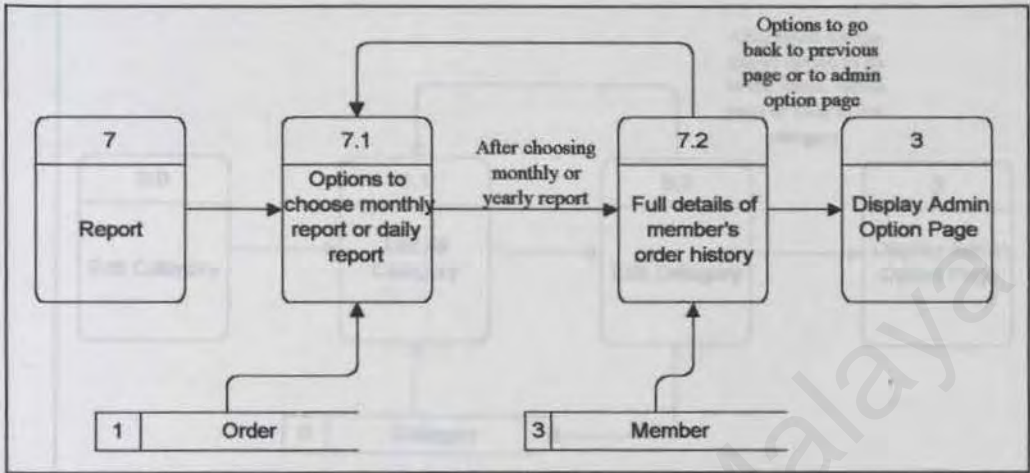


Figure 3.15: Figure 7 Diagram of Report Module

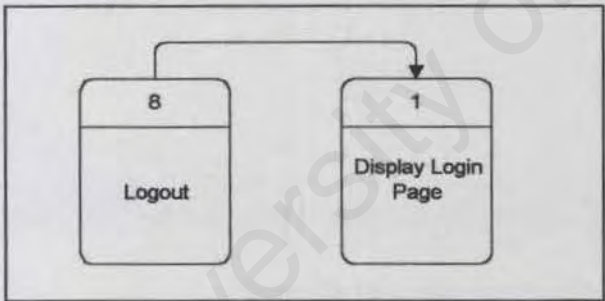


Figure 3.16: Figure 8 Diagram of Logout System

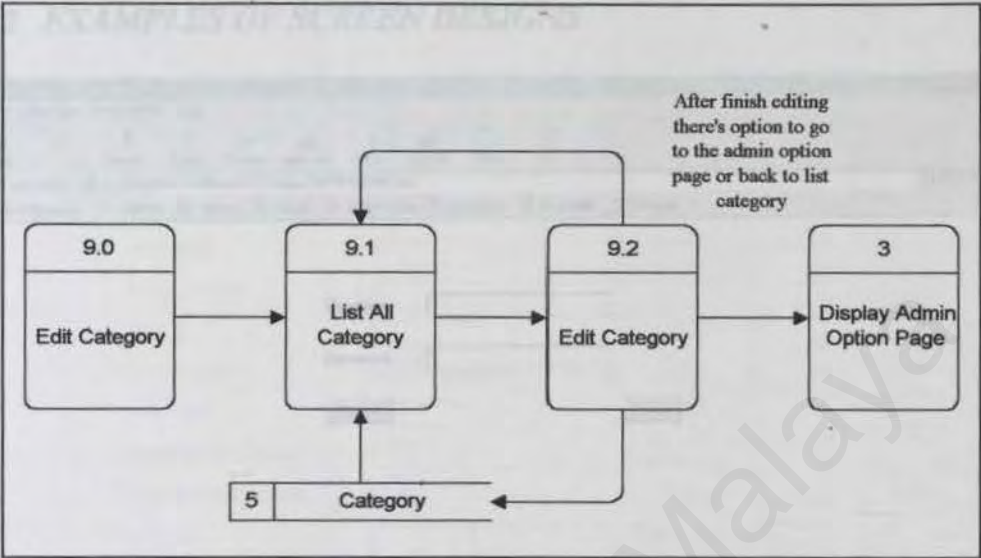


Figure 3.17: Figure 9 Diagram of Edit Category Module

3.6.2 EXAMPLES OF SCREEN DESIGNS

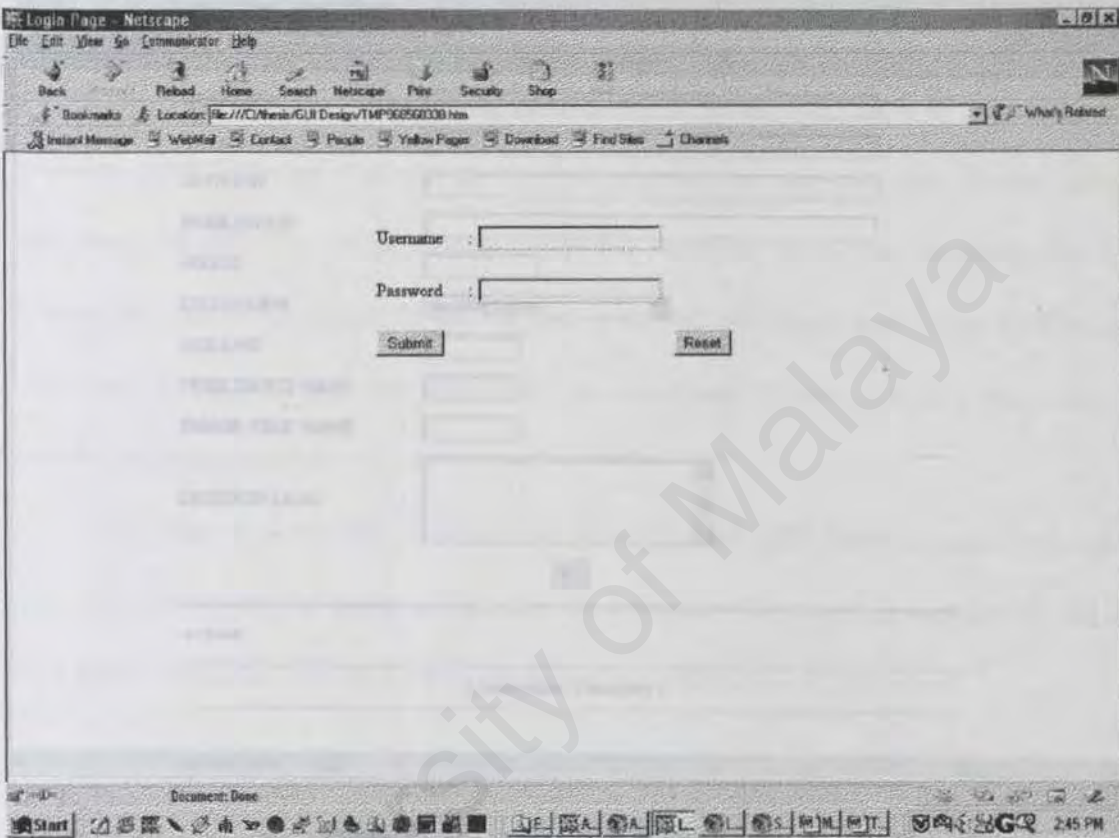


Figure 3.18: Admin Login Page

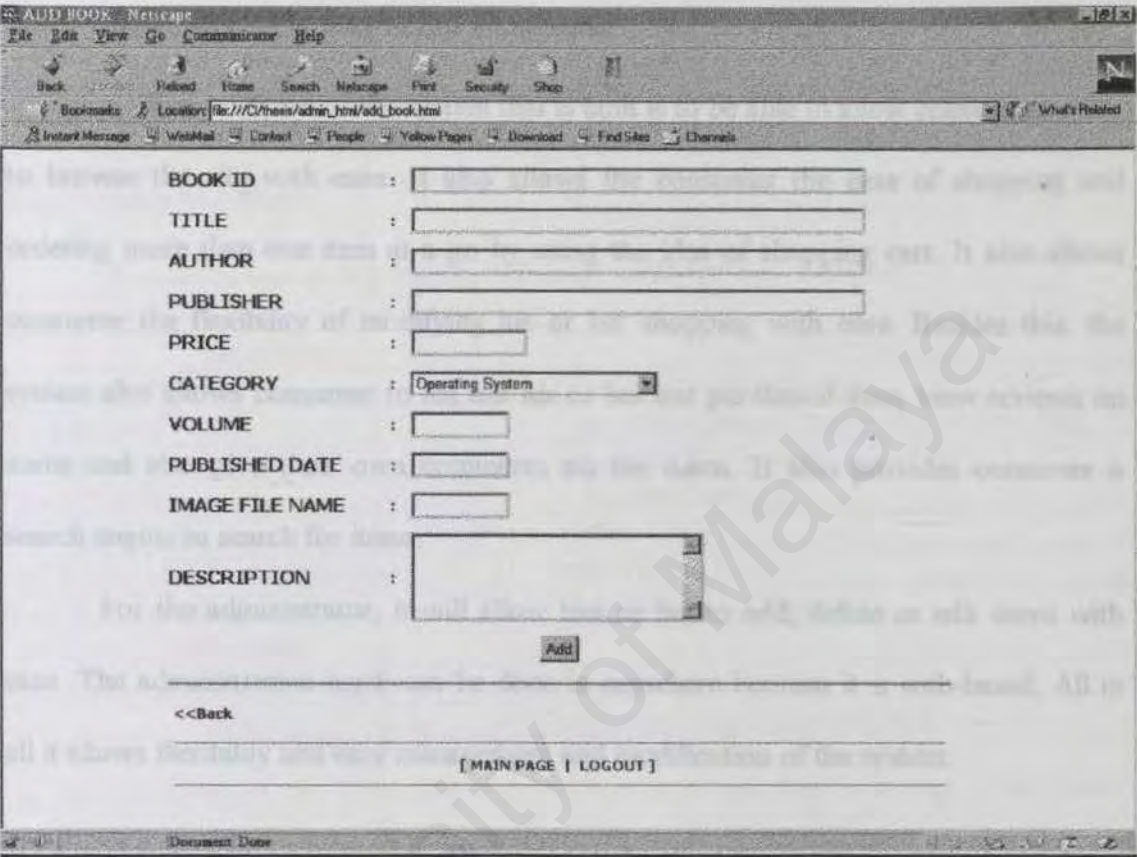


Figure 3.19: Admin Add Item Page

3.7 Statement Of Expected Outcome

The outcome of the system that is built is to be able to allow consumer to browse the site with ease. It also allows the consumer the ease of shopping and ordering more than one item at a go by using the idea of shopping cart. It also allows consumer the flexibility of modifying his or her shopping with ease. Besides this, the system also allows consumer to list out his or her last purchased item, view reviews on items and also give their own comments on the items. It also provides consumer a search engine to search for items.

For the administrator, it will allow him or her to add, delete or edit items with ease. The administrative work can be done in anywhere because it is web-based. All in all it allows flexibility and easy management and modification of the system.

SYSTEM IMPLEMENTATION

4.1 System Setup:

The system was built using the following hardware and software:

Hardware	Software
Pentium II 233	Linux Operating System
4.1 GB Hard Disk	Java technology: Java Server Pages(JSP)
96 MB RAM	Apache Web Server
CD-ROM Drive	Apache Jserv-1.1
1.44 MB Floppy	JDK-1.2.2
15" Color Multimedia Monitor	JSWDK-1.0.1
Two Buttons Mouse	MYSQL-3.23 Database
101 Enhanced Keyboard	
NIC (Network Interface Card)	

Table 4.1: Listing Of Hardware And Software Used

On the software part, the first thing that was needed to be setup is setting up the Linux operating system that will support the system. After setting up and configuring it to be able to connect to the network and also the Internet the next thing to do is install the MYSQL-3.23, Apache web server and JDK-1.2.2. After that, the next sequence of installation is first Apache Jserv-1.1 and then followed by JSWDK-1.0.1. The sequencing here is important because each software is interdependent. So if the sequencing is wrong then there will be an error during the installation process.

The next thing to do is to tweak or configure the operating system to recognize and work with the new software that were installed. The first thing to do is to edit a configuration file called *profile*. This file is located at a directory called *etc*. In that file, 3 lines are added:

- `PATH="$PATH:/your-directory-path/jdk1.2.2/bin"`
- `CLASSPATH=/your-directory-path/jdk1.2.2/lib/tools.jar:/your-directory-path/JSDK2.0/lib/jsdk.jar:/your-directory-path/mm.mysql.jdbc-1.2c`
- `JAVA_HOME=/your-directory-path/jdk1.2.2`

*‘your-directory-path’ here means the location of the software that were installed such as Apache Jserv and JDK-1.2.2.

The `PATH`, `CLASSPATH` and `JAVA_HOME` are then added to the `export` command which is located at the end of the file. The `mm.mysql.jdbc-1-2c` is a driver and bridge that connects the server scripts to the `MYSQL` database whenever a server script needs to connect to the database. The next file that will be touched on is the `http.conf`. This configuration file tells the web server how and what to do with clients’ request. To make the web server to be able to sent all `jsp` file extension to the right place to be processed, this line is needed to be added to the file:

- `Include /etc/httpd/conf/jserv/jserv.conf`

4.1.1 Database Design

The database that was design was given the name **thesis**. It consist of 7 tables:

1. admin
2. books
3. category
4. credit_cards

5. members

6. orders

7. reviews

Data Type Descriptions

Data Type	Definition
varchar	Stores data in a variable length string whereby values are stored using only as many characters as are needed
Char	Stores data in a fixed length that was created when the table was created
Int	Stores values in a fixed length numerical format without precision when the table was created
datetime	Stores date and time
Text	Stores data in the text format
Double	Stores data in a fixed length numerical format with precision being specified by the creator of the table

Table 4.2: Data Type Description**Tables' Descriptions*****admin table:***

Field Name	Data Type	Key	Extra
password	varchar(255)		
username	varchar(50)	Primary Key	
session id	varchar(20)		

Table 4.3: Admin Table***books table:***

Field Name	Data Type	Key	Extra
bookID	varchar(20)	Primary Key	
Title	varchar(255)		
Price	double(10,2)		
CatID	int(4)		
volume	int(10)		

description	text		
Date	datetime		
published	varchar(255)		
Image	varchar(255)		
Author	varchar(255)		
publisher	varchar(255)		

Table 4.4: Book Table*category table:*

Field Name	Data Type	Key	Extra
CatID	int(4)	Primary Key	auto_increment
category	varchar(255)		

Table 4.5: Category Table*credit_card table:*

Field Name	Data Type	Key	Extra
credit_card	varchar(16)	Primary Key	
Month	char(3)		
Year	varchar(10)		
Name	varchar(255)		
CcID	int(3)		

Table 4.6: Credit Card Table*members table:*

Field Name	Data Type	Key	Extra
Fullname	varchar(50)		
UserID	varchar(50)	Primary Key	
Password	varchar(255)		
Address	varchar(50)		
City	varchar(50)		
State	varchar(50)		
Postcode	int(10)		
Date	datetime		
Phone	int(12)		
Email	varchar(255)		
TotalOrder	int(10)		

Table 4.7: Members Table

orders table:

Field Name	Data Type	Key	Extra
Ordered	varchar(255)	Primary Key	
order_date	datetime		
BookID	varchar(255)		
UserID	varchar(255)		
Volume	int(10)		
purchasedID	varchar(255)		
status	int(2)		

Table 4.8: Orders Table**reviews table:**

Field Name	Data Type	Key	Extra
reviewID	varchar(255)	Primary Key	
review	varchar(255)		
UserID	varchar(255)		
BookID	varchar(255)		
Time	int(10)		
Status	int(2)		

Table 4.9: Reviews Table

4.2 System Testing

The testing strategy that was used is known as unit testing. Where each module is created and tested repeatedly for the correctness of its logics and syntax.

4.2.1 Unit Testing

In this testing, each module of the system is consider as a unit and each unit is first coded out and tested individually for any logic or syntax errors. Under unit testing, each module is subjected to several examinations that are listed below:

4.2.1.1 Review/Examining The Code

The most basic testing technique is reviewing the code. The important functions in each module is commented so that it can be traced easily in the future. Before this is done, each function in the module will be tested out on the correctness of its logics, system flow and syntax. To trap errors that might occurred during the execution of the codes, a *try* and *catch* method is used.

Example:

```
<%
String bookID="";
try {
    bookID=request.getParameter("bookID");
}
catch(Exception e){
```



```
out.println("Error while retrieving data : "+e.getMessage());
```

```
}
```

```
%>
```

When the an error does occurred than the error message will be printed out on the web page using the *out.println()*; method.

4.2.1.2 Using Test Cases For Testing

Dummy data will be used to test the stability and efficiency of the system. This method is practical in the sense that it mirrors real life attributes and this will be able test how far the system can cope with.

4.2.1.3 System Testing By Other Users

Structural testing is still not enough to test the reliability of the system. Therefore other users were ask to help out to test the system. The method of using other users to test the system can eliminate the biases that the developer process. Developer will tend to think the system is running fine according this his or her view. So what developer deems for example to be user friendly interface might not be viewed the same as others. Beside this it can also helps to pin point any bugs that might still exist in the system.

4.2.2 Integration Testing

When all modules are well and fully tested at the unit testing section, these modules will then be link up and integrate together to become the main system. Further testing was also carried out while integrating the system. The testing was done to check:

- Errors during integration
- Logics of the system
- Directory path of the system flow
- Overall system whether it meets the required objectives

The whole system testing approached uses sandwich approach testing whereby, each module will be tested individually and then combined together to become the main system and then tested again. The integration testing also used the same approached, as was how each individual module was tested. That is by reviewing the logics and system flows, use test cases and system testing by other users to get feedback regarding the system.

PROJECT FINDINGS AND CONCLUSION

5.1 System Evaluation

Upon completion of the system, the system's strength and limited were evaluated. Below are the listed findings:

5.1.1 System Strength

After testing and evaluating the system, the strength of it lies in several areas. The strengths are:

- Allow the consumers to exit from the site at any instances
- Allow the consumers to view and edit their own personal details and at the same time view their current and past orders
- Let consumers to store their orders in shopping cart and allows them to change their orders at anytime that they wishes with ease before they make any payment
- The system allows the administrator the ease of maintaining the system such as erasing redundant data and so fort
- Only allows one administrator to modify the system at a time, this is to keep maintain the integrity of the system
- Print daily, monthly and yearly report so that the administrator can come up with some useful analysis based on those reports

5.1.2 System Limitation

When administrator login to do administrator work, a session will be created and stored in the database. The reason for this is to allow verification of the administrator and also to prevent other administrator to login into the system do some modification. But when the administrator fail to logout probably such as accidentally close the browser, the stored session will still be in the database thus it will prevent others to login using the same login. Thus, the administrator has to manually reset the session in the database to null to enable the administrator to login again. Cookies are another method that can be deployed to solve this problem but it also have its draw backs such as not all browser supports cookies or some browsers does not automatically enable accepting cookies. Because of this problem, the consumer module only uses session to track member's who has login.

The system also only virtually let administrator to place order on books with limited volume to the supplier. This part of the function assumes that the supplier has received the order from the administrator.

5.2 Future Enhancement

- Improve the system by allowing consumers to send in their feedback about the site.
- Create a module that will automatically notify the each member about the current state of their orders and also the order particulars. This will be done by e-mailing all the purchasing details to the consumers. One of the reasons for this is to ensure that consumers have made the correct purchase. If there is any wrong charges or purchased, then consumer can use the e-mail as evidence and check with the administrator of the site.
- Create a free e-mail account for each consumer who has register to the site. With this feature, it will allow the consumer to come the site more often. It will also not limit the consumer to just browse and shop at the site but also allow them to check their own personal e-mail.
- Modify and enhance the report generation functions to make it more detailed and sophisticated.

5.3 Problems Encountered

There were many problems encountered while building the system. Most of them are system setup problems. Below is the list of problems that were encountered:

- JDK compiler, JSP/servlet engine (JSWDK) and the web server cannot function properly while executing the server site scripts. These problems were solved by editing and adding edition paths in the environment path.
- Unable to initiate cookies. Therefore server site session has to be implemented. This is because JSWDK does not work well with cookies.
- Difficulty in coding because there is no effective and user friendly editor and debugger around.
- Creating and editing database is very troublesome because MYSQL database does not provide graphical user interface, therefore all tasks have to be done via command line.

5.4 Conclusion

The system that was built has met the goals and objectives that were set out to achieve in during the planning of this system:

- User-friendly interface and easy of navigation.
- Successful development of the basic foundation of the system as a stand-alone system.
- Easy integration and enhancement of the system for future growth.
- Ease of maintaining the system by the administrator.

Besides these objectives, the system was given an added functionality, which is report generation. Even the report generation here is simple but it does provide some useful information to the administrator. Future enhancement will be made to provide a more sophisticated report generation.

For the final remark, it can be said that this project was a golden opportunity to learn the process of building a system from scratch and also learn the fundamentals of Internet programming.

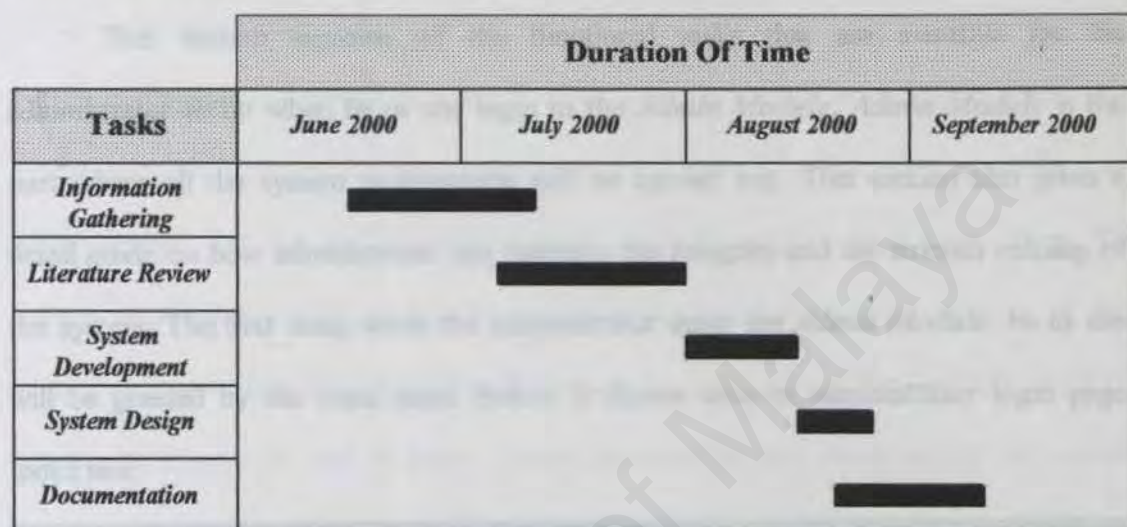
APPENDICES

References

- [1] www.zdnet.com
- [2] www.ecommercetimes.com
- [3] Michael Peirce . Scaleable , Secure Cash Payment for WWW with the PayMe Protocol Set , www.cs.tcd.ie/www/mepeirce/mepeirce.html
- [4] VISA . www.visa.com/nt/ecommm/set/intro.html
- [5] www.whatis.com
- [6] www.mysql.com
- [7] www.slashdot.org
- [8] www.execdecisions.com/what_is_ecommerce.html
- [9] H.M. Deitel, P.J.Deitel, 1999. Java How To Program, Third Edition. Prentice Hall.
- [10] www.apache.org
- [11] www.java.sun.com
- [12] Raymond McLeod, Jr. 1998. Management Information Systems Seventh Edition. Prentice Hall.
- [13] www.amazon.com
- [14] www.mphonline.com.sg
- [15] www.microsoft.com

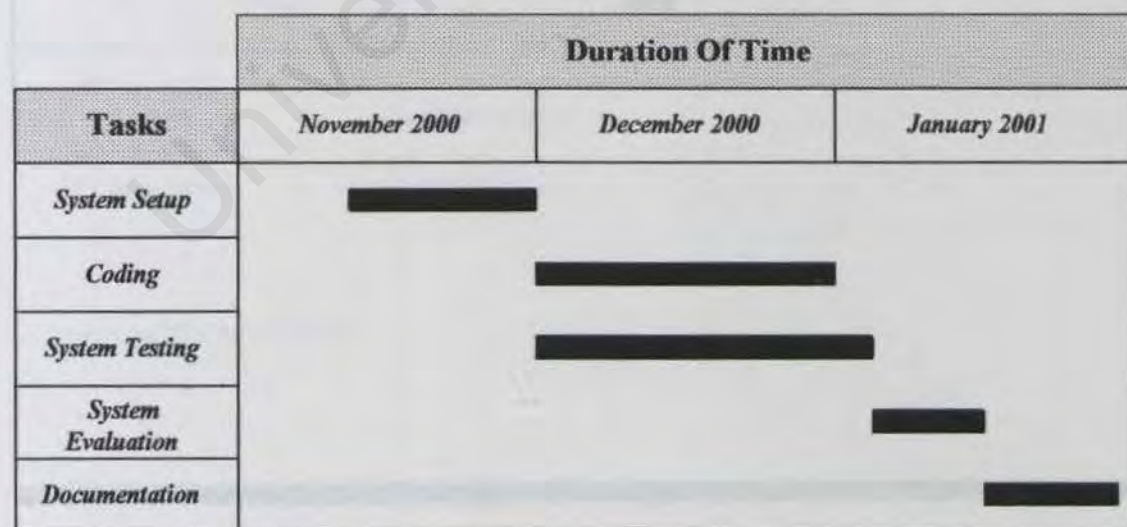
Project Schedule

The figure below described the time taken in preparing the proposal:



Gantt Chart showing the duration of each task in preparing the proposal

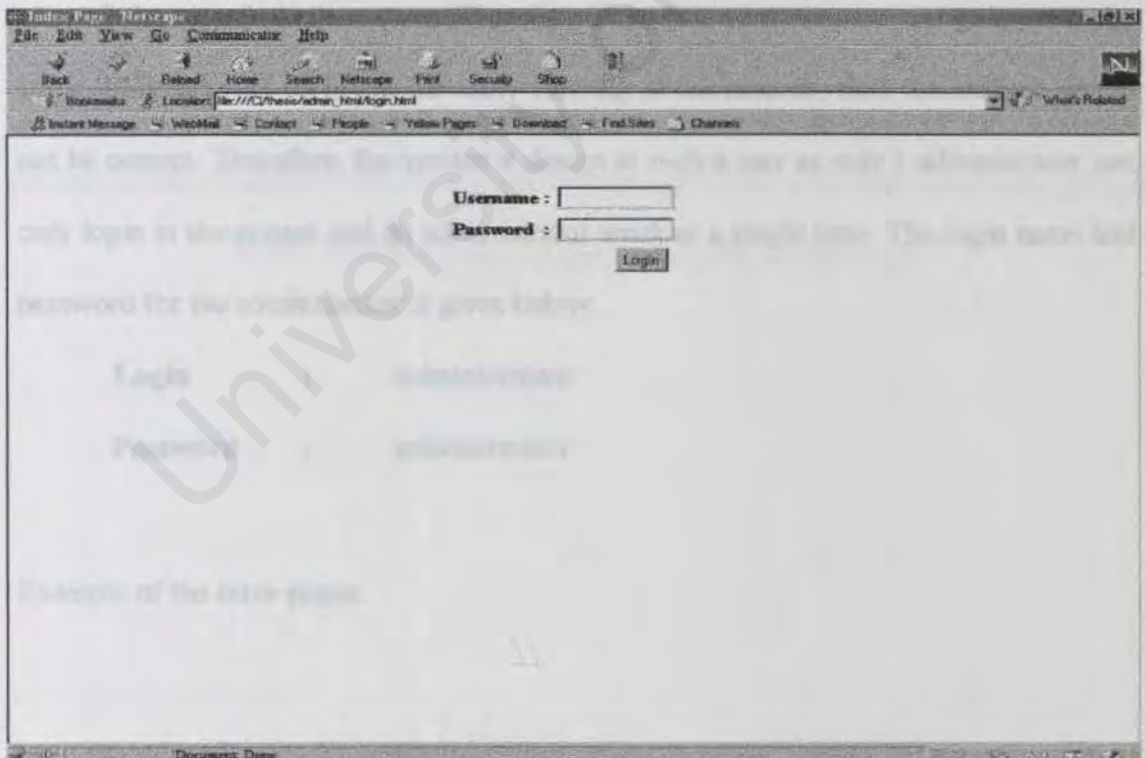
The figure below described the time taken in implementing the system:



Gantt Chart showing the duration of each task in implementing the system

User Manual

This section explains all the functional tasks that are available for the administrator to do when he or she login to the *Admin Module*. *Admin Module* is the part where all the system maintenance will be carried out. This section also gives a detail guide on how administrator can maintain the integrity and the smooth running of the system. The first thing when the administrator enter the *Admin Module*, he or she will be greeted by the login page. Below is shown how an administrator login page looks like:



Admin Login Page

There are 2 possible errors when an administrator login:

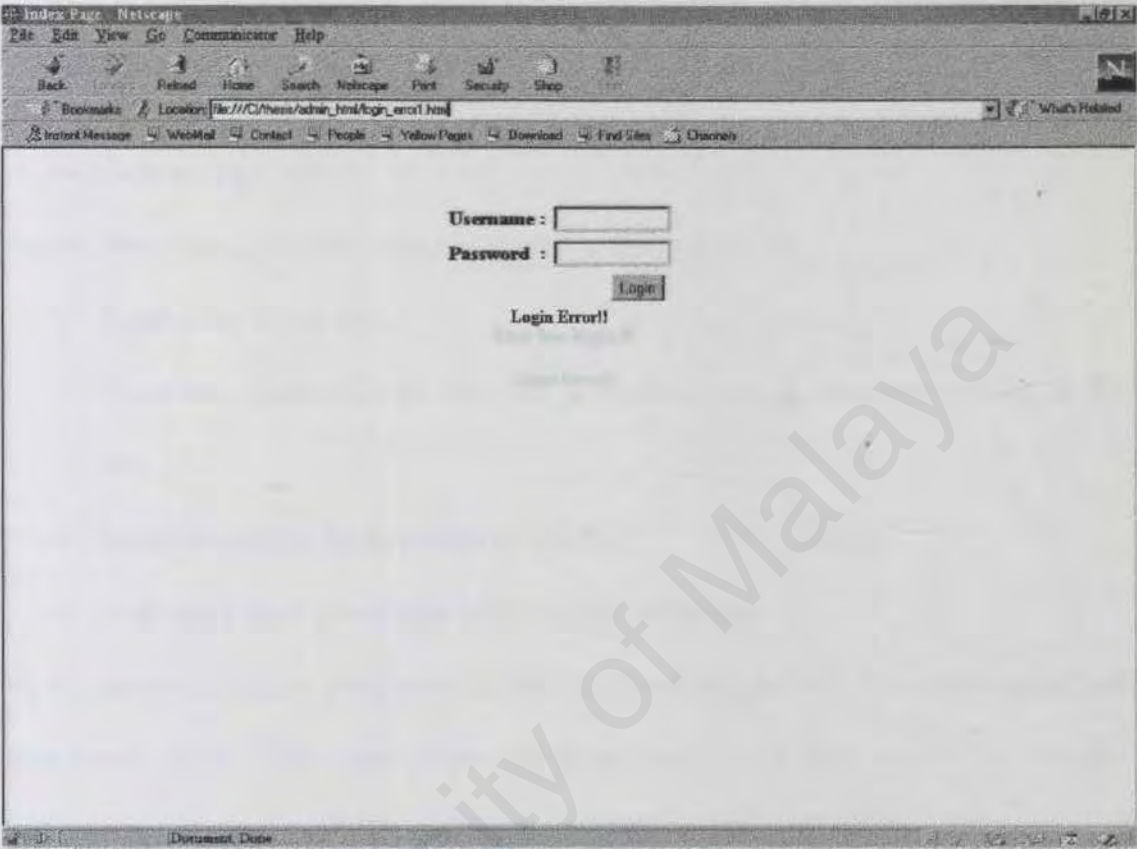
1. Wrong password and username
2. Administrator has already login

At this point, some explanations are needed on why the second error might occur. The reason is to maintain integrity and stability of the system. If 2 administrators login in at different time, lets say the first administrator login the earliest then followed by the second administrator. When the second administrator makes some changes to the system such as adding new member and new book to the system, the first administrator would not known of such changes simply because the first administrator has earlier view all the records in the system. Therefore if the first administrator was going to make some analysis based on his or her early viewing of the records, then the analysis would not be correct. Therefore, the system is design in such a way as only 1 administrator can only login in the system and do administrator work at a single time. The login name and password for the administrator is given below:

Login : administrator

Password : administrator

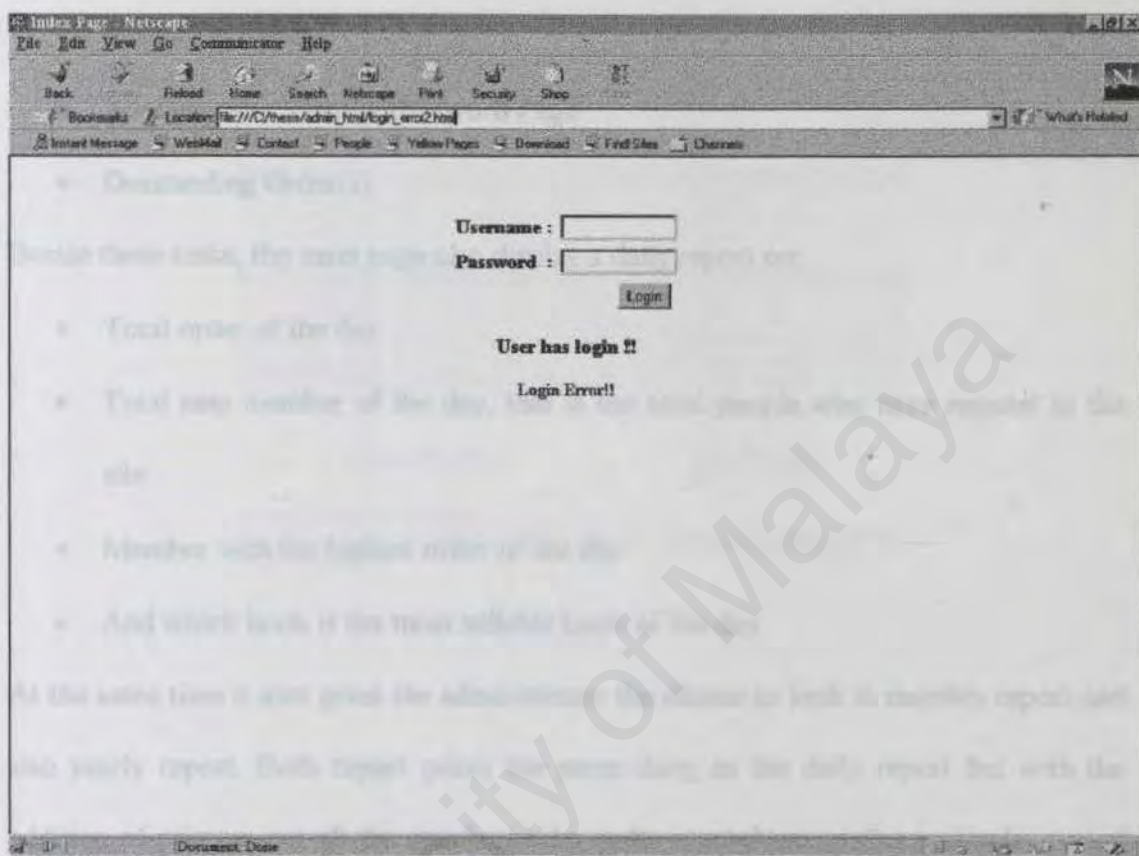
Example of the error pages:



Wrong Password Or Username Or Both Error Page

When the administrator is successfully login, a page contains all the administrative tasks that the administrator can perform. The tasks are:

- Add New Book
- Stock Listing
- List Approved Reviews
- List Unapproved Reviews
- Category Listing



User Has Already Login Error Page

When the administrator is successfully login, a page contains all the maintenance tasks that the administrator can perform. The tasks are:

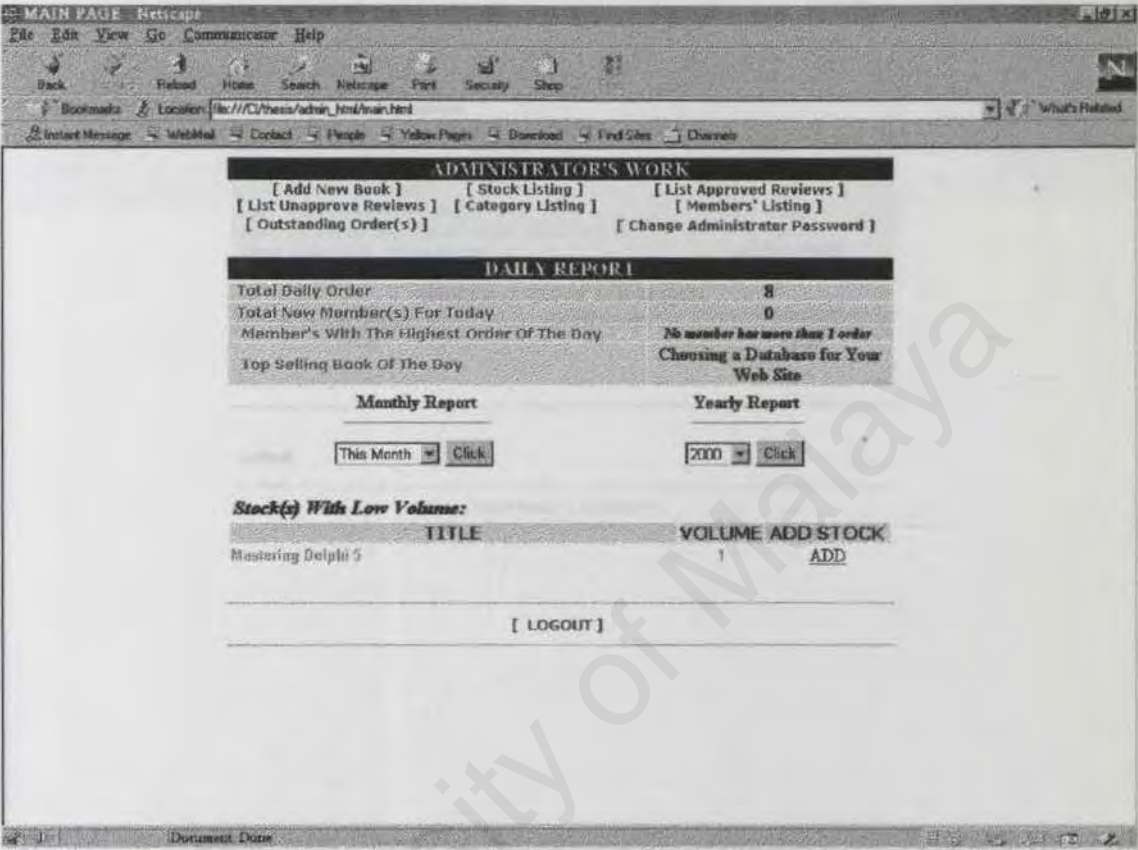
- Add New Book
- Stocks Listing
- List Approved Reviews
- List Unapproved Reviews
- Category Listing

- Members' Listing
- Administrator Change Password Page
- Outstanding Order(s)

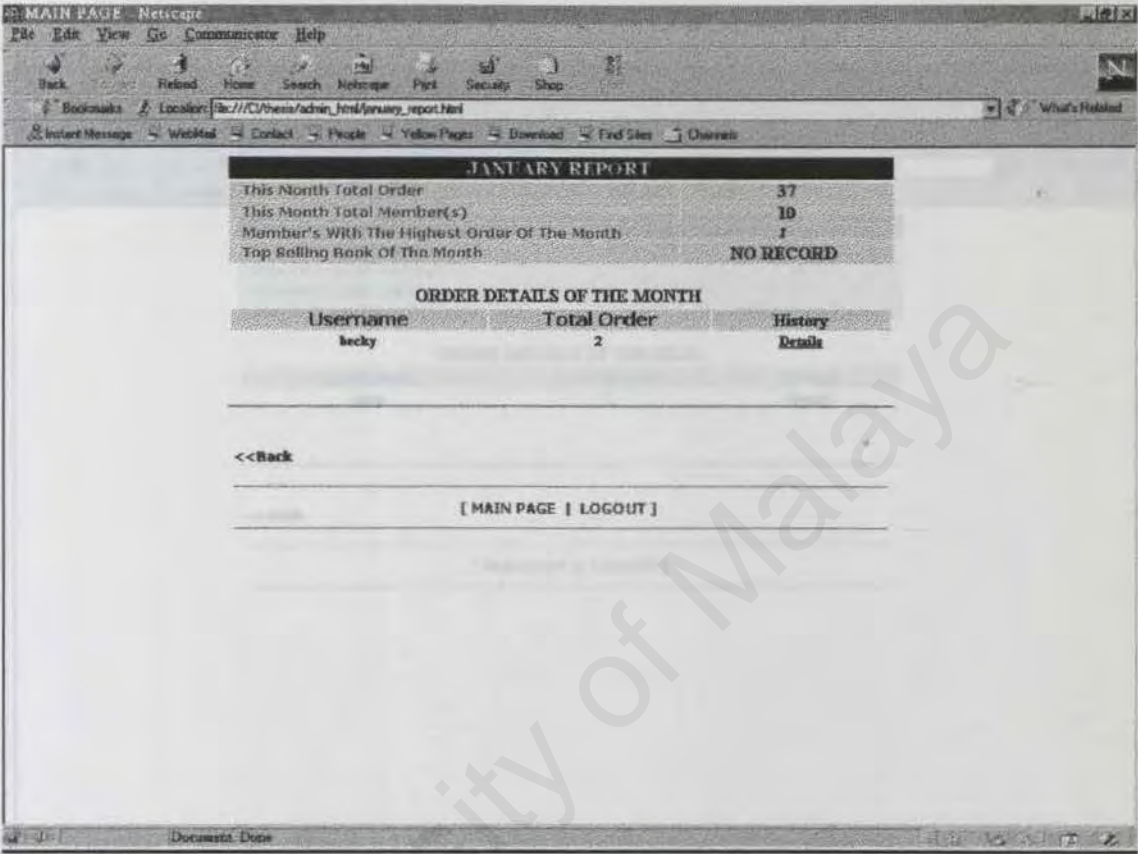
Beside these tasks, the main page also display a daily report on:

- Total order of the day
- Total new member of the day, that is the total people who have register to the site
- Member with the highest order of the day
- And which book is the most sellable book of the day

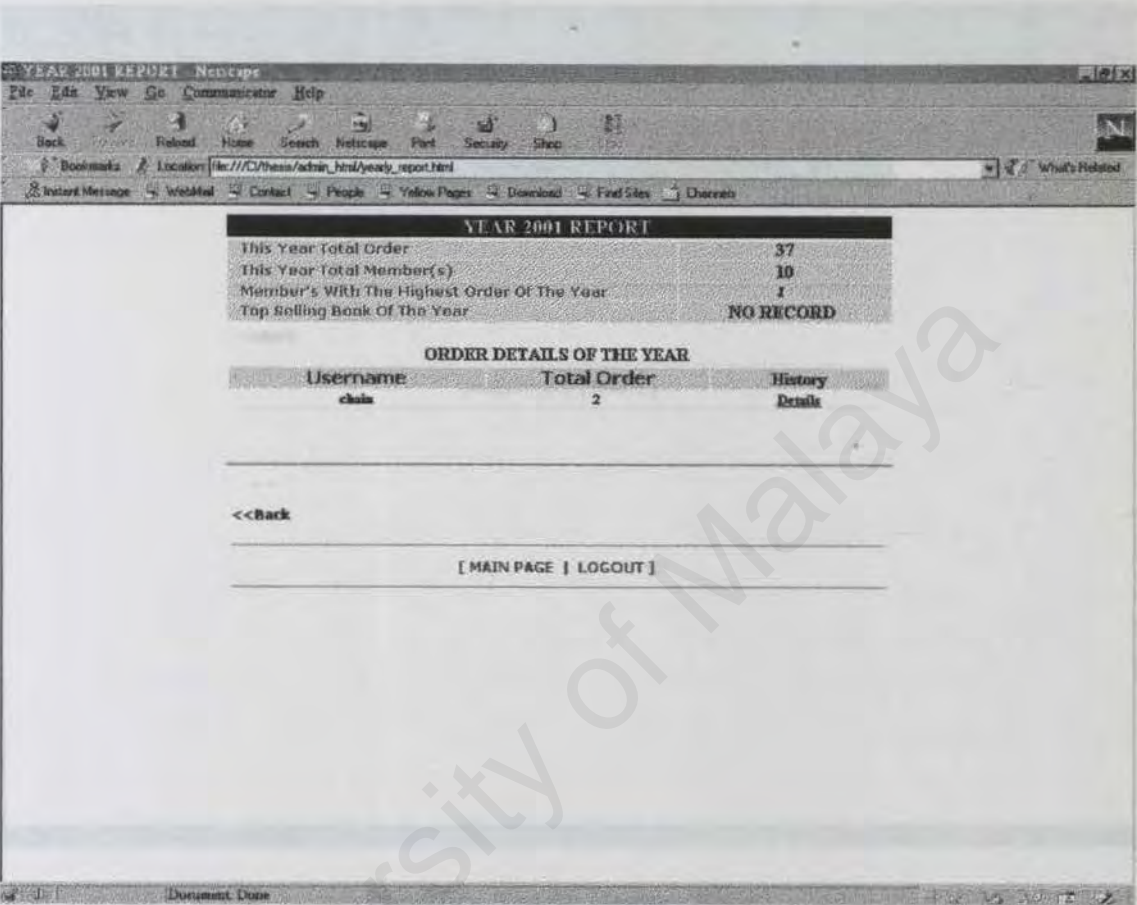
At the same time it also gives the administrator the choice to look at monthly report and also yearly report. Both report prints the same thing as the daily report but with the addition of printing out all the members who make a purchase on that particular period and also all the details of what each member has order on the same period. The main page also display which stock has the lowest volume, and allows the administrator the flexibility to place order to the distributor for extra stock.



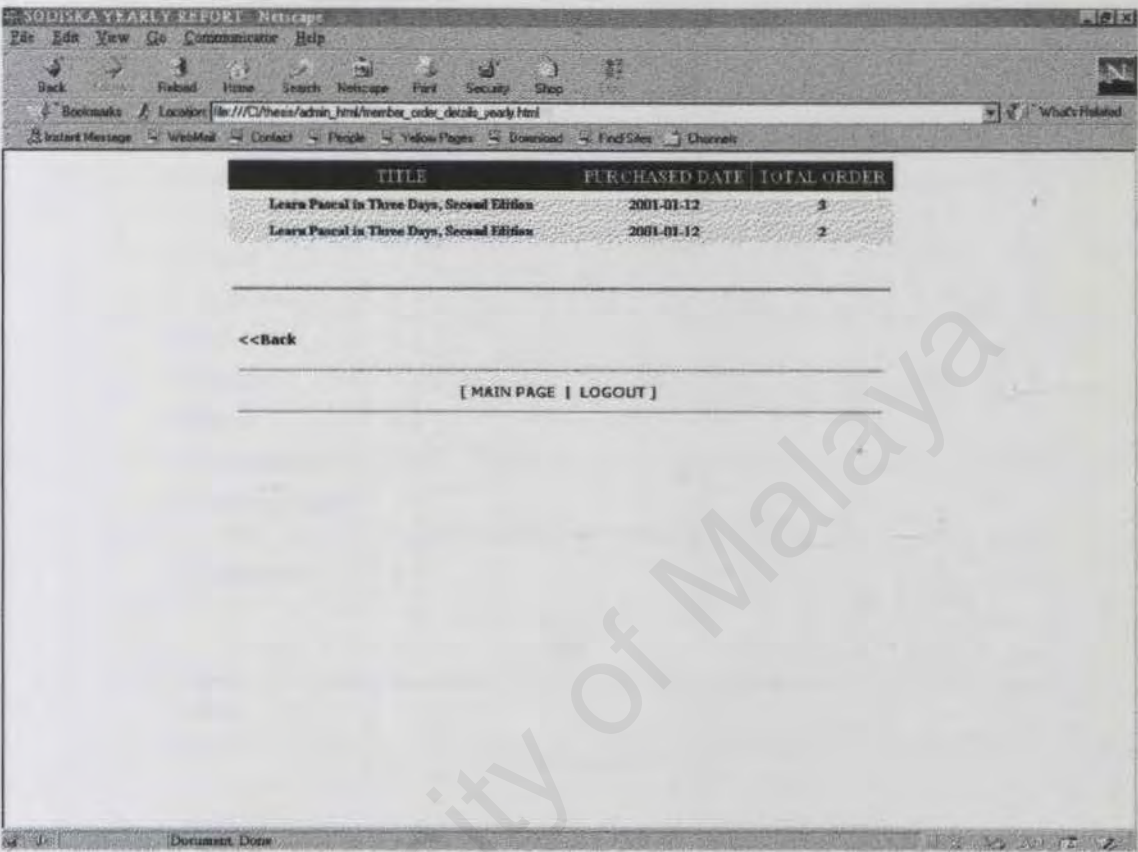
Admin Main Page



Monthly Report Page



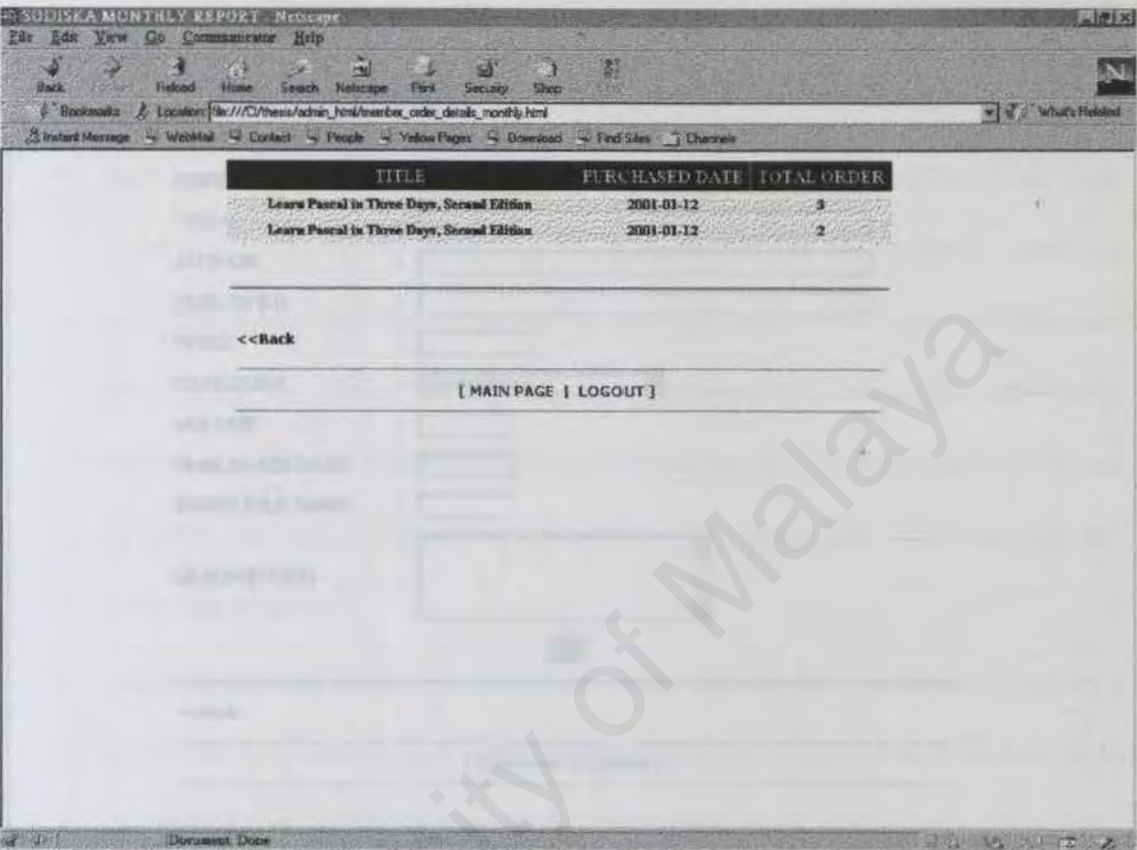
Yearly Report Page



Member Yearly Report Page

1. Add New Book Link

When administrator click on the add new book link, a page as shown below will be displayed etc. It allows the administrator the flexibility to add new book link back to make page be layout respectively.



Member Monthly Report Page

1. Add New Book Link

When administrator click on the *Add New Book* link, a page as shown below will be displayed out. It allows the administrator the flexibility to add new book for back to main page or logout completely.

- Add the book link to change the name of the book, author name, publisher name, published date, value of the book representing the book. Add some description to the book and so forth.

ADD BOOK

BOOK ID :

TITLE :

AUTHOR :

PUBLISHER :

PRICE :

CATEGORY :

VOLUME :

PUBLISHED DATE :

IMAGE FILE NAME :

DESCRIPTION :

<<Back

[MAIN PAGE | LOGOUT]

Add New Book Page

2. Stocks Listing Link

This link will lead the administrator to a list of available books that are in the system's database. This page will display out some of the details of each books such its title, price, available stock and so forth. In this page administrator can do the following tasks:

- Edit the book such as change the name of the book, author name, publisher name, published date, name of the image representing the book, add extra description to the book and so fort

- Delete the books in the database, administrator has the option deleting 1 book or multiple book at the same time
- Add review in this case is given by the administrator on what he or she feels about the book, review given by the administrator is automatically given the approved status and will be posted up to let consumers to view while review send in by the consumers will be given unapproved status and need to be reviewed by the administrator before it can be posted up. The reason for this is to filter out any profanity sent by the consumers and also correct any grammatical errors
- Lastly is the add stock option whereby administrator can add extra copies of a certain book by sending out order to the distributor, when this is done a message detailing the arrival of the stock to the administrator

Edin Book - Netscape

FileEditViewGoCommunicatorHelp

ReloadHomeSearchWebpagePrintSecurityStop

BookmarksLocationfile:///C:/inetpub/admin_html/list_books.html

Instant MessageWebMailContactPeopleYellow PagesDownloadFind SitesChannels

Stocks Listing

Total Stock(s): 45

BookID	Title	Price	Category	Volume	Edit	Delete	Add Review	Add Stock
0471375225	Open Source XML Database Toolkit: Resource and Techniques for Improved Development	134.97	Database	1	Edit	<input type="checkbox"/>	Add Review	Add
0471296902	Choosing a Database for Your Web Site	135.59	Database	10	Edit	<input type="checkbox"/>	Add Review	Add
1575211394	Teach Yourself Active Web Database Programming in 21 Days	39.99	Database	10	Edit	<input type="checkbox"/>	Add Review	Add
0849322049	Web Data Management and Electronic Commerce	186.75	Database	10	Edit	<input type="checkbox"/>	Add Review	Add

Delete

page 1 2 3 4 NEXT

<<Back

[MAIN PAGE | ADD NEW BOOK | LOGOUT]

Document: Doc00

Stocks Listings Page

EDIT BOOK Netscape

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop

Bookmarks Location bar: file:///C:/www/adnan_hani/edit_book.html

Internet Message WebMail Contact People Yellow Pages Download Find Sites Channels

Book ID

0471375225

Title

Open Source XML Data

Author

Liam Quinn

Publisher

John Wiley & Sons

Price

999.00

Category

Databases

Image File Name

0471375225.gif

Published Date

12/2/1999

Description

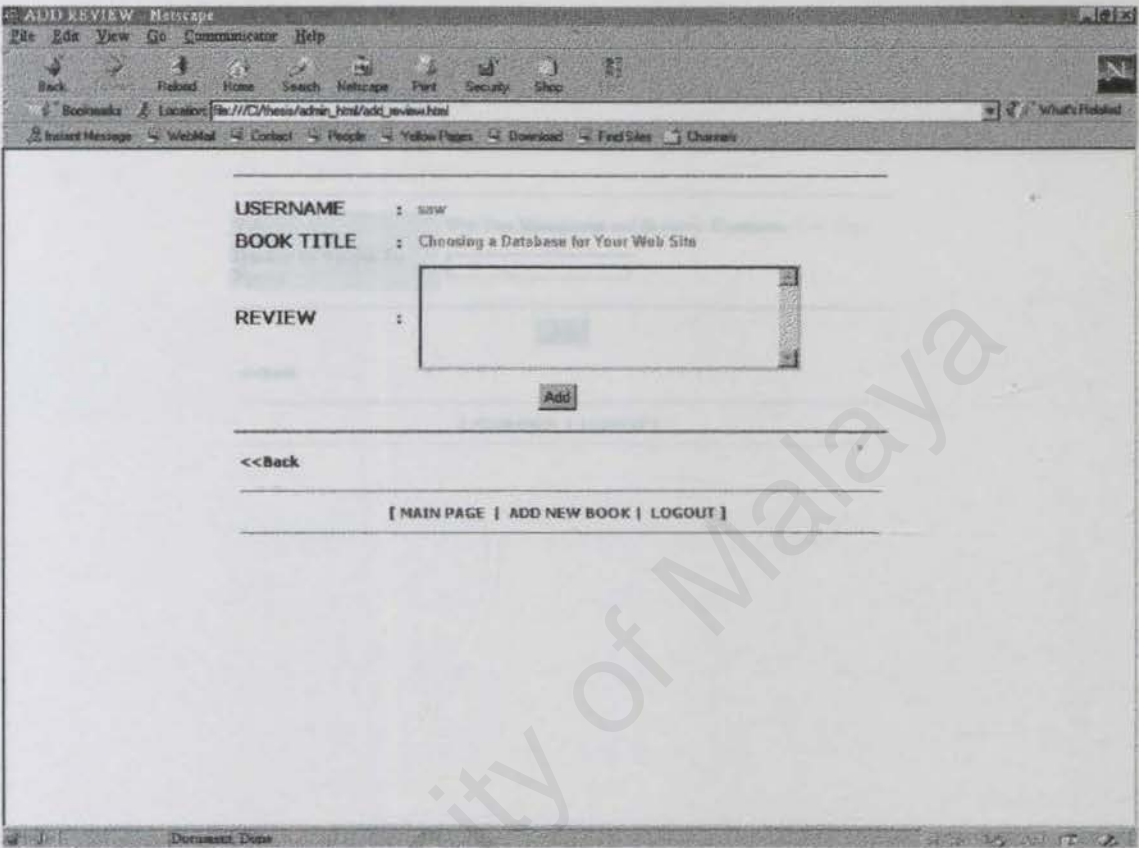
An in-depth in how XML works.
It teaches near beginner the
do and dont in XML .

Update

<<Back

[MAIN PAGE | ADD NEW BOOK | LOGOUT]

Edit Book Page



Add Review Page

PURCHASE PAGE Netscape

File Edit View Go Communication Help

Back Forward Home Search Netscape Print Security Shop

Bookmarks Location: http://10.10.10.10/admin_html/purchase.html What's Related

Instant Message WebMail Contact People Yellow Pages Download Find Sites Choose

Title Web Data Management and Electronic Commerce [View Page](#)

Number Of Volume To Placed

[<<Back](#)

[\[MAIN PAGE | LOGOUT \]](#)

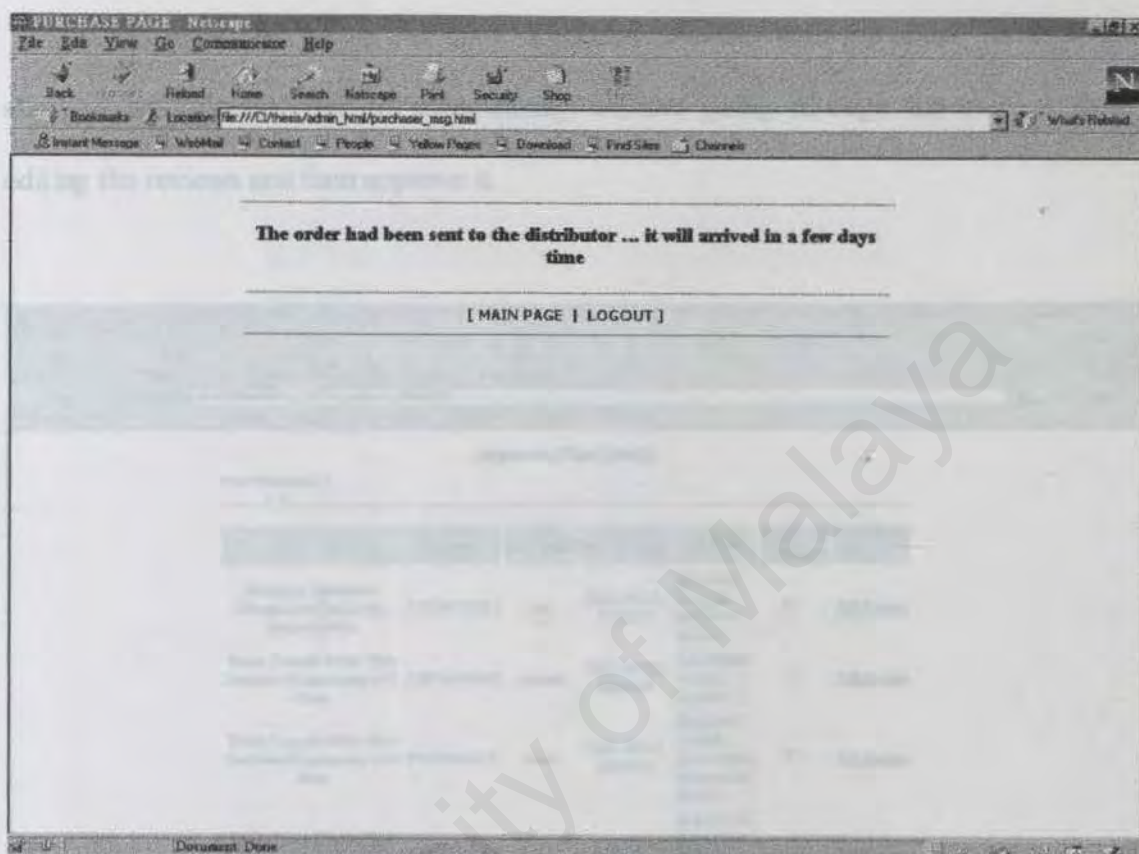
Document Done

Add Stock Page

3. List Approved Reviews Link

This page displays out all the reviews in details such as the review itself, title of the book, who sent the review and when, review ID and so forth that were approved by the administrator. The reason for showing this list is to allow administrator to delete or edit the reviews whenever possible. The deleting of the reviews can be done 1 at a time or few at once go.

4. List Unapproved Reviews Link



Add Stock Confirm Page

3. List Approved Reviews Link

This page displayed out all the reviews in details such as the review itself, title of the book, who sent the review and when, review ID and so forth that were approved by the administrator. The reason for showing this list is to allow administrator to delete or edit the reviews whenever possible. The deleting of the reviews can be done 1 at a time or few at one go.

4. List Unapproved Reviews Link

This page also shows the same thing as above but with the added function of allowing the administrator to straightaway without going through the step of first editing the reviews and then approve it.

Approved Review(s)

Total Review(s): 5

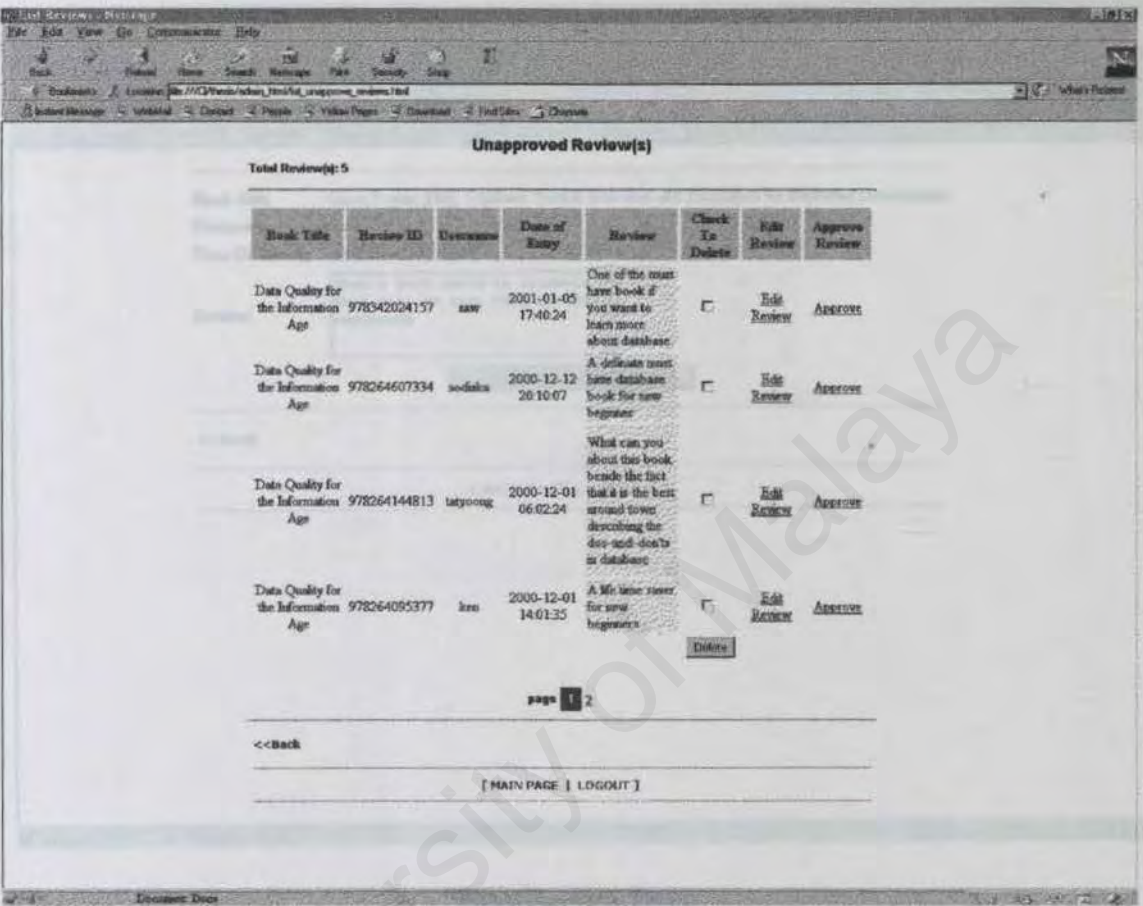
Book Title	Review ID	Username	Date of Entry	Review	Check To Delete	Edit Review
Enterprise Operations Management Handbook, Second Edition	979316701001	saw	2001-01-16 11:25:00	No doubt this is the best book around	<input type="checkbox"/>	Edit Review
Teach Yourself Active Web Database Programming in 21 Days	979316469307	yeeteng	2001-01-13 00:21:09	A must have for new beginners	<input type="checkbox"/>	Edit Review
Teach Yourself Active Web Database Programming in 21 Days	979316426175	chan	2001-01-13 00:20:26	Buy it and you will know what a treasure this book is	<input type="checkbox"/>	Edit Review
Teach Yourself Active Web Database Programming in 21 Days	979283266802	so-daka	2000-12-12 15:07:46	A quick and fast look on what database is all about	<input type="checkbox"/>	Edit Review

page 1 2

<< Back

[MAIN PAGE | LOGOUT]

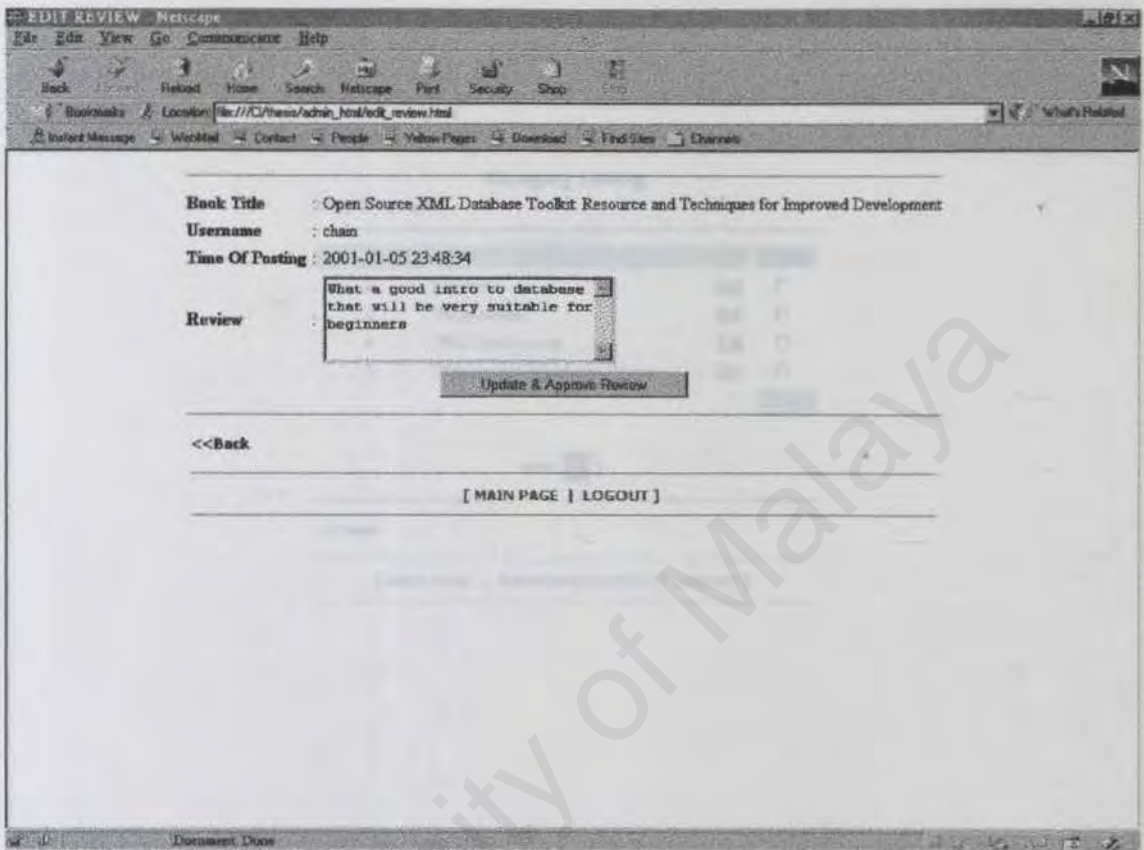
List Approved Reviews Page



List Unapproved Reviews Page

5. Category Listing Page

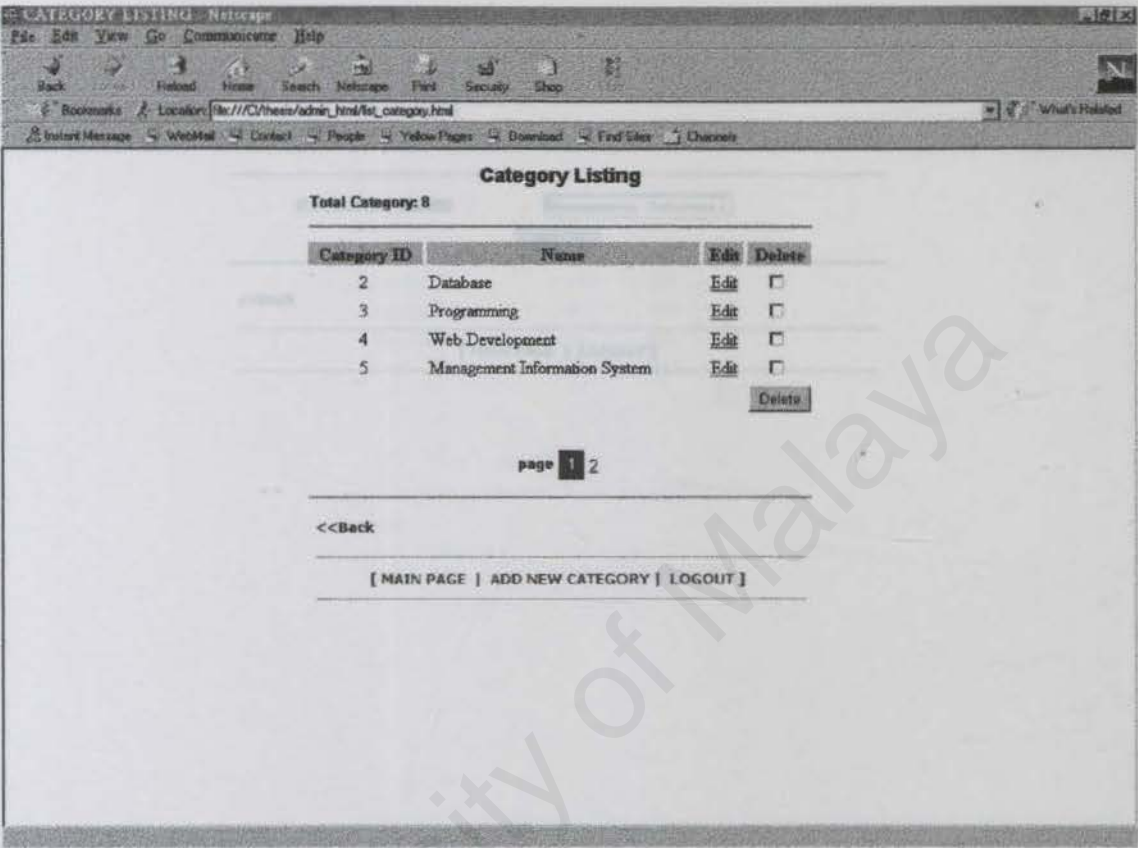
All the categories that are in the system's database will be listed out to allow administrators to do editing, adding and deleting. Deleting function again can be done 1 at a time or first at once go. In the editing page, only the name of the category can be modified while its ID cannot be changed due to the fact that each new category that is added is automatically given a unique ID value, therefore its ID is allowed to be changed therefore database integrity might occur.



Edit Review Page

5. Category Listing Link

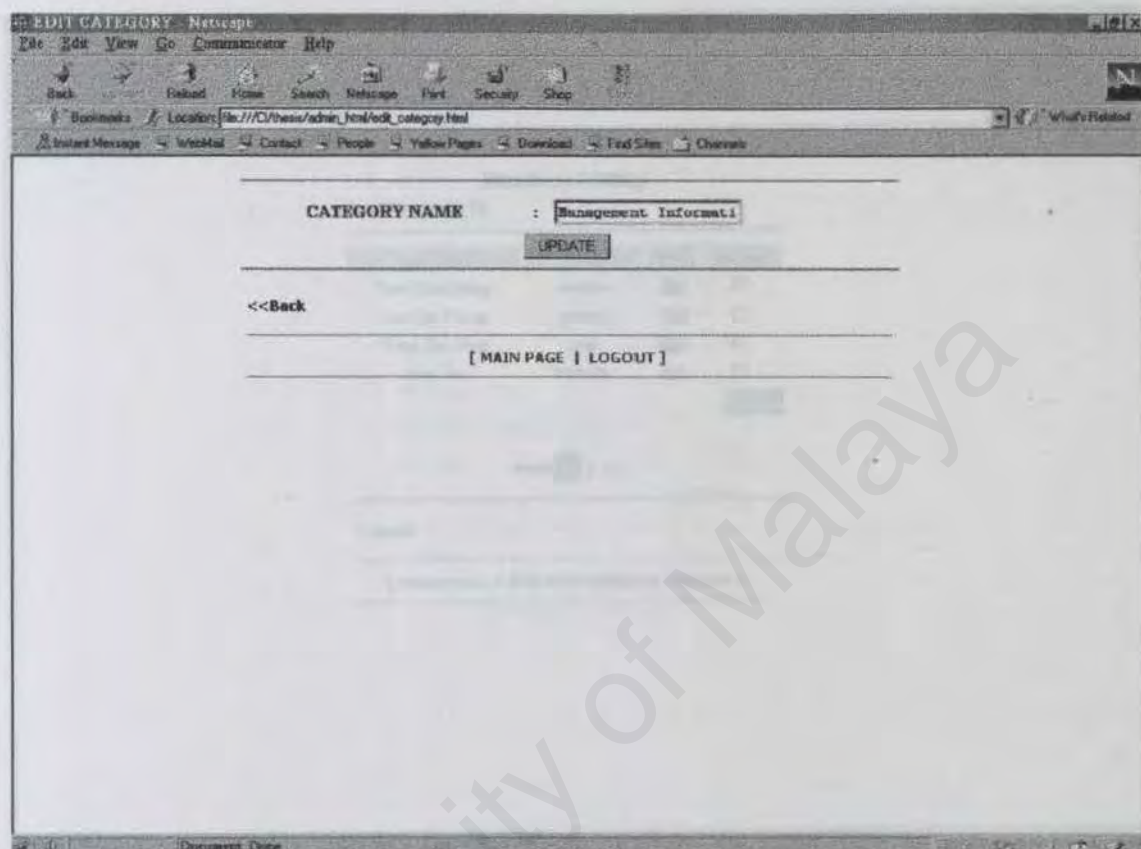
All the categories that are in the system's database will be listed out to allow administrator to do editing, adding and deleting. Deleting function again can be done 1 at a time or few at one go. In the editing page, only the name of the category can be modified while its ID cannot be change due to the fact that each new category that is added is automatically given a unique ID value, therefore if ID is allowed to be changed therefore database integrity might occur.



Category Listing Page

6. Members' Listing

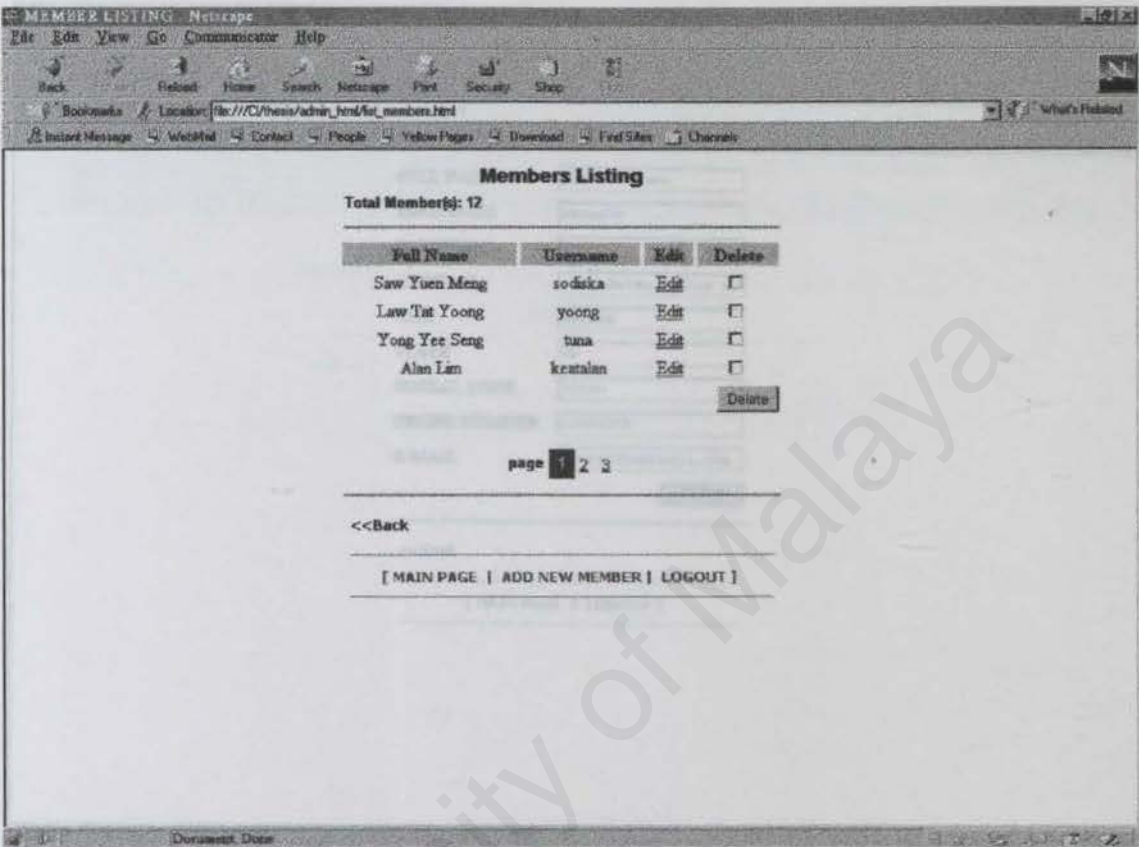
This page displays out all the people who have registered to the site. It also lists out each member's full name and their username. There is also the option of deleting and editing of each member. In the editing part, member's details such full name, address, username, password and so forth can be edited by the administrator if the need arises. At the same time there is also an option to let administrator to add new members into the system.



Edit Category Page

6. Members' Listing

This page displayed out all the people who have registered to the site. It also lists out each member's full name and their username. There is also the option of deleting and editing of each member. In the editing part, member's details such full name, address, username, password and so forth can be edited by the administrator if the need arises. At the same time there is also an option to let administrator to add new member into the system.



Members Listing Page

7. Administrator Change Password Link

This page allows the administrator to change his or her password if he or she sees needs to change.

EDIT MEMBER

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Stop

Bookmarks Location bar http://localhost/admin_html/edit_member.html

Instant Message WebMail Contact People Yellow Pages Download Find Sites Check

What's Related

FULL NAME: Tan Wei Kuan

USERNAME: mktan78

PASSWORD: ***

ADDRESS: 12A, Jalan Walter Gr

CITY: Melaka

STATE: JP

POSTAL CODE: 55100

PHONE NUMBER: 52444376

E-MAIL: mktan78@hotmail.com

UPDATE

<<Back

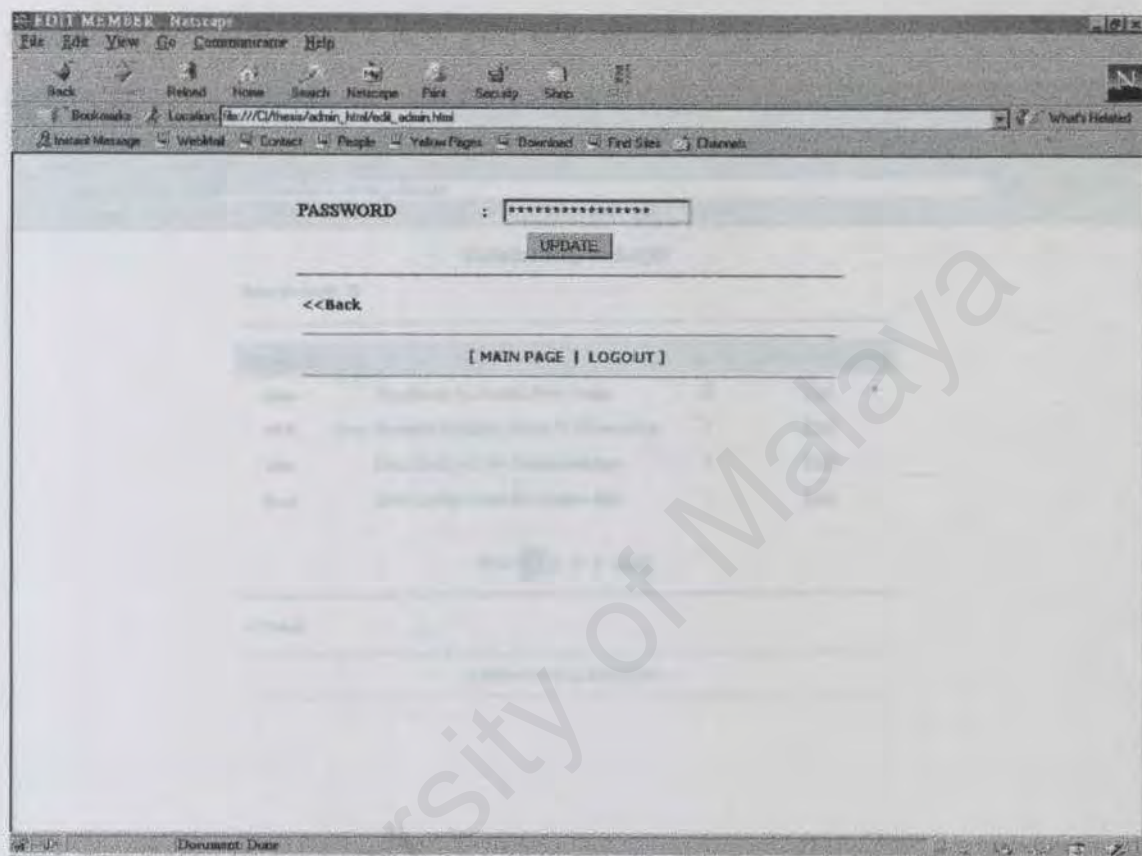
[MAIN PAGE | LOGOUT]

Document Done

Edit Member Page

7. Administrator Change Password Link

This page allows the administrator to change his or her password if he or she see needs to change.

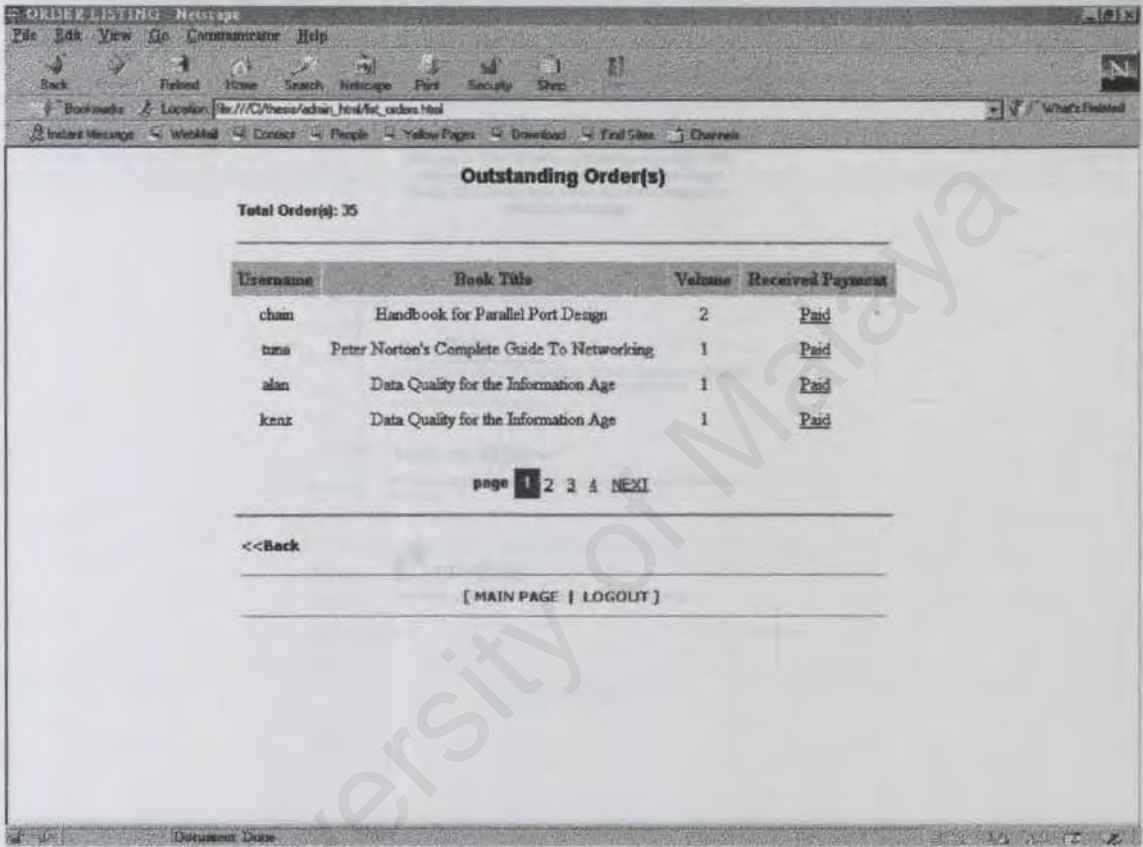


Change Administrator Password Page

8. Outstanding Order(s) Link

Listing of all orders that have not been processed. Not processed here means that either the book has not been sent to the user or there is some delay in receiving the money from the member's credit card company. Details that are listed in this page are the members' username and their correspondence book title and total order of each book. If there is confirmation of the delivery of the book to each member and also payment received by the member's credit card company then, administrator can just edit

the member by clicking on the *Paid* option and thus the member will not be seen on the outstanding list again until the he or she make another purchase.



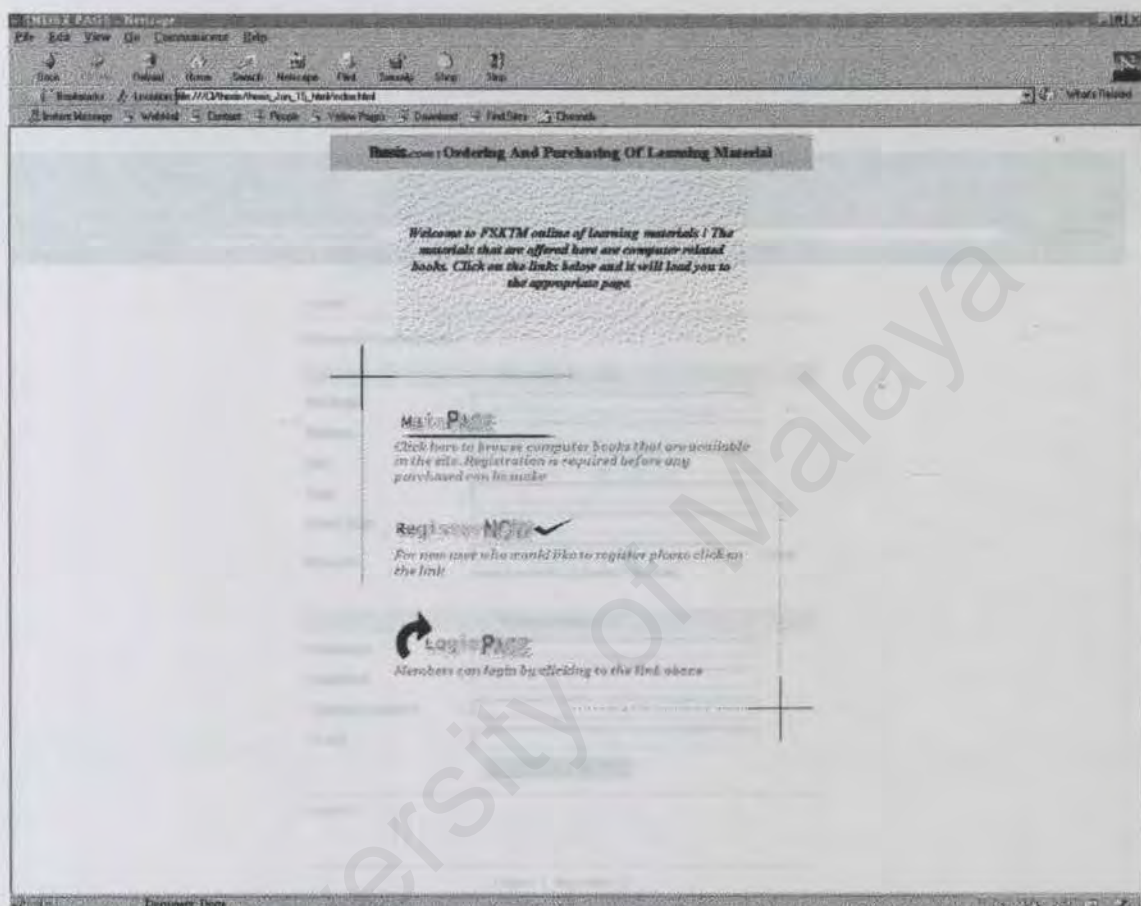
Outstanding Order(s) Page

Consumer Module

When a consumer browses the site, he or she will be greeted by a splash page. The splash page will display 3 options to the user:

- *Main Page*
- *Registration Page*

- **Login Page**



Splash Page

1. Registration Page

Registration page is the page where consumer fill in their particulars such as address, username, password and forth. The reason for registration is to make sure that only registered user can buy products from the site and also to allow consumers to keep track on products that he or she has ordered. It also allows the administrator of the site to track consumers who have made purchased at the site. Thus it facilitates the

administrator to analyze the trends and characteristics of the consumers. In doing so, this will help to enhance the system to be more user friendly and cater more to the consumers' needs.

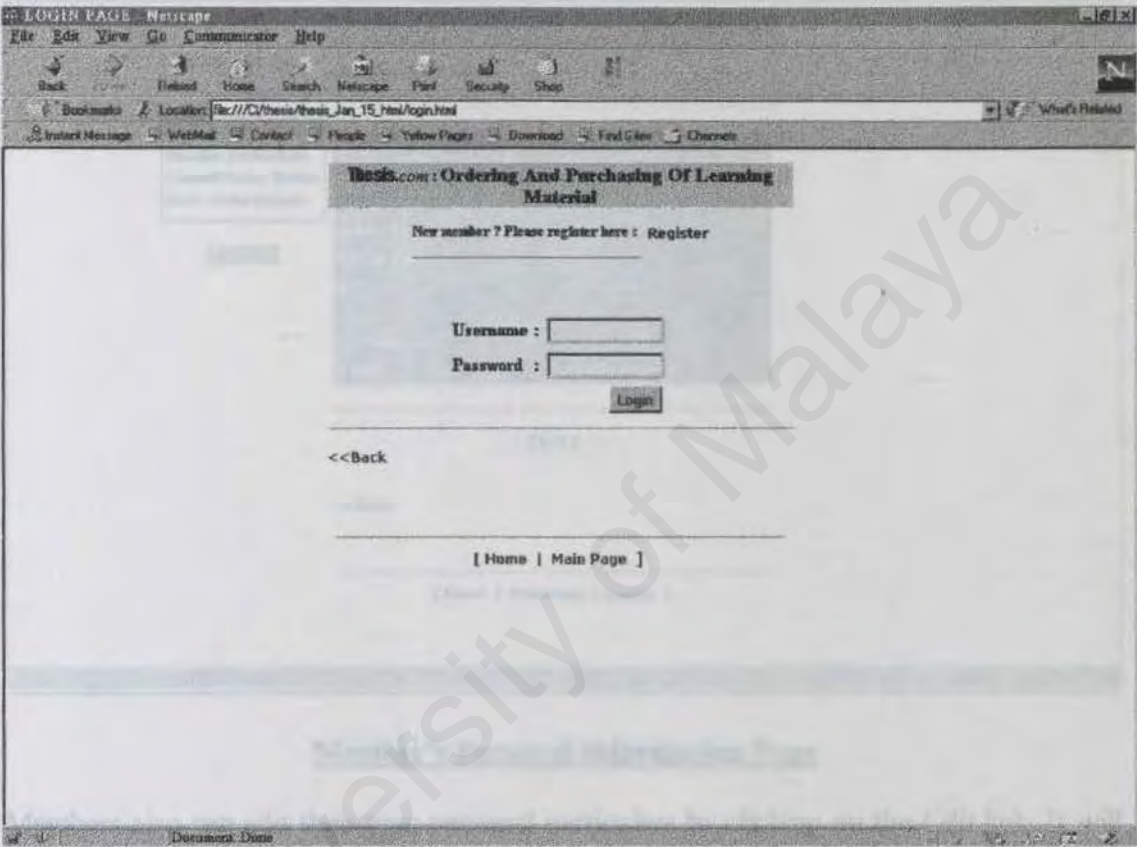
The screenshot displays a web browser window with a registration form. The browser's address bar shows the URL 'http://www.fsktm.com/Registration.html'. The form is titled 'Registration' and has a '<< Back' link at the top left. Below the title, a note states 'All fields with * must be filled in'. The form is organized into two main sections: 'Personal Information' and 'Account Information'. The 'Personal Information' section contains six fields: 'Full Name', 'Address', 'City', 'State', 'Postal Code', and 'Phone No.'. The 'Phone No.' field has a small note below it: 'number must be five D.S and no 4/5s allow'. The 'Account Information' section contains four fields: 'Username', 'Password', 'Confirm Password', and 'E-mail'. At the bottom of the form, there are two buttons: 'REGISTER' and 'RESET'. A '<< Back' link is also present at the bottom left of the form area. The browser's status bar at the bottom shows 'Document: Data'.

Registration Page

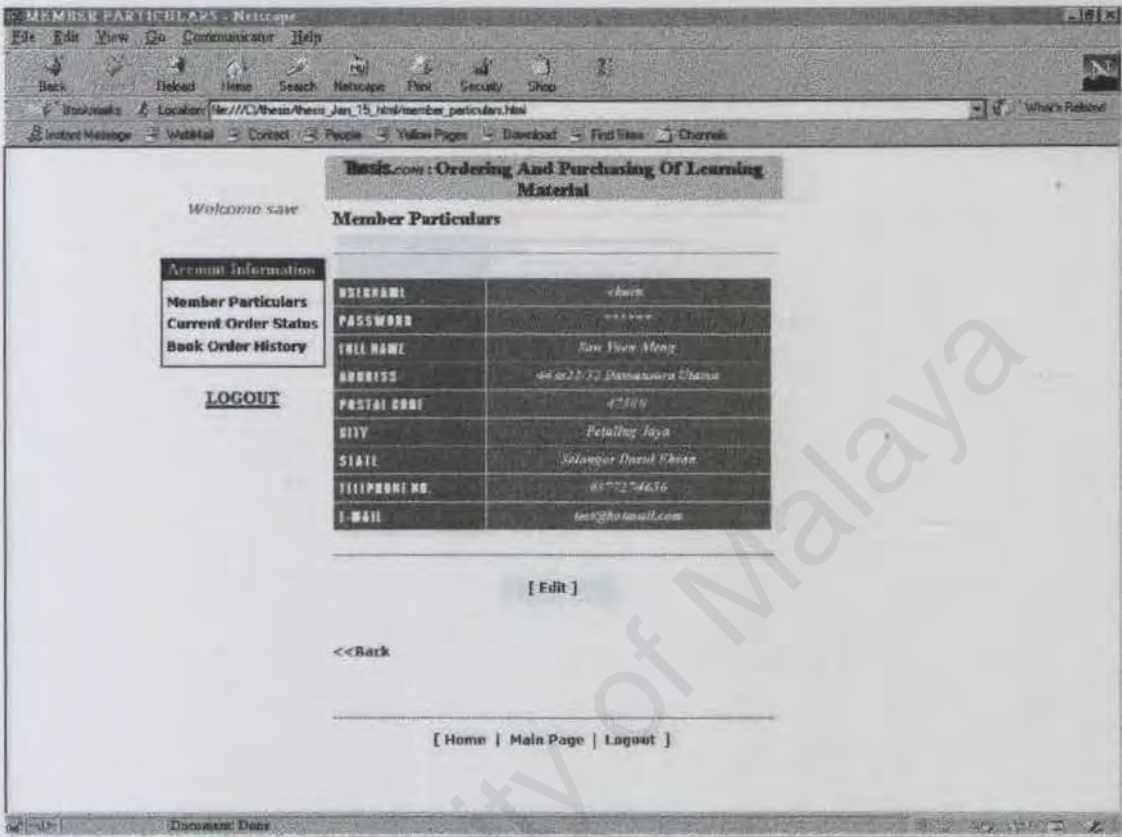
2. Login Page

This is where registered user can login and check their particulars and also edit it if they see fit to do so. Beside this it also allow members to view past and current order. In the current order section, members will be able to see all the detailed orders such as book title and purchased date that are still under process. Under processed means that

either the book is still not yet deliver to the member or payment has not been sent by the member's credit card company.



Member Login Page



Member's Personal Information Page

Members also can edit their own personal particulars by clicking on the *Edit* link. It will display out a page to allow members to make any changes. After updating the page it will redirect them back to the member particulars page to view the latest changes.

EDIT MEMBER PARTICULARS - Netscape

File Edit View Go Communicate Help

Reload Home Search Messages Post Security Shop

Location: file:///C:/Users/hsen_jan_15/html/edit_member.html

Instant Message WebMail Contact People Yellow Pages Download Find Sites Channels

haziz.com: Ordering And Purchasing Of Learning Material

Welcome test

Account Information

Member Particulars

Book Order Status

Book Order History

LOGOUT

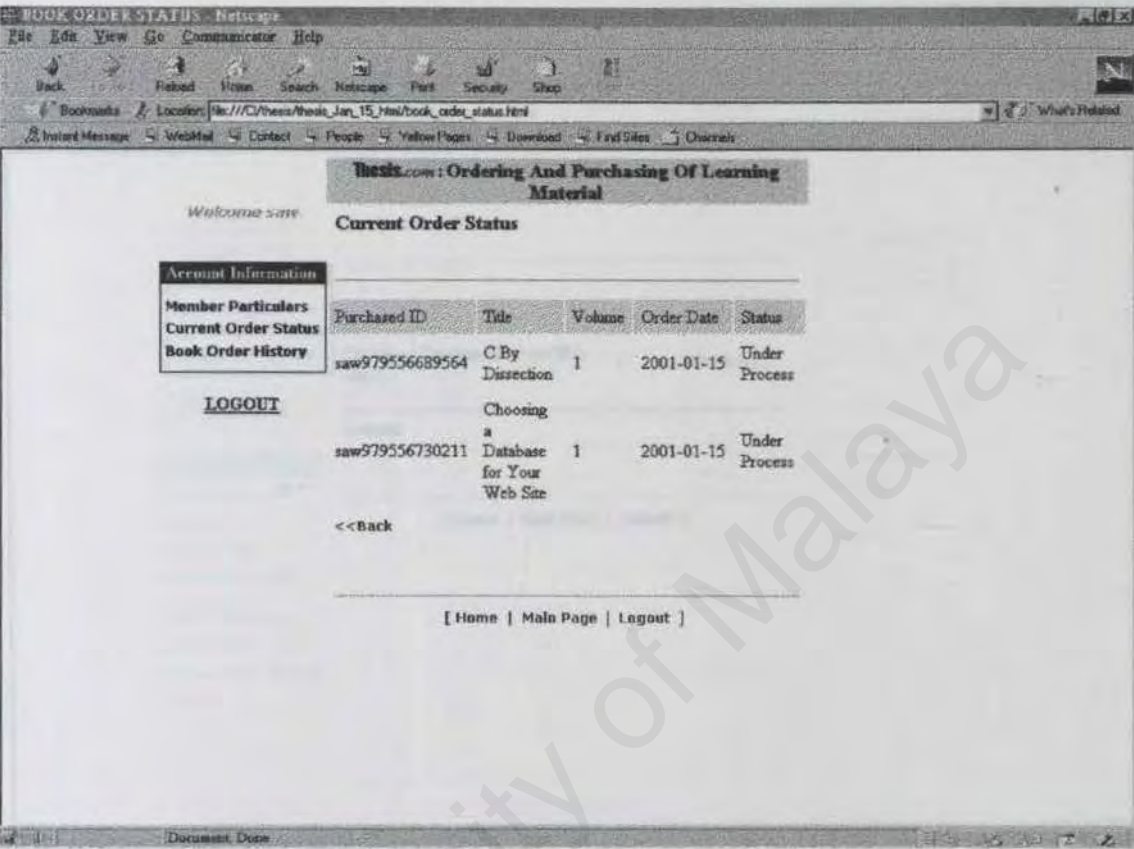
USERNAME	test
PASSWORD	*****
INITIAL	Saw Yuen Meng
ADDRESS	55 ss22/32 Damansara
POSTAL CODE	47600
CITY	Petaling Jaya
STATE	Selangor Darul Ehsan
TELEPHONE NO.	0377444477
E-MAIL	test@hotmail.com

Update Now

<<Back

[Home | Main Page | Logout]

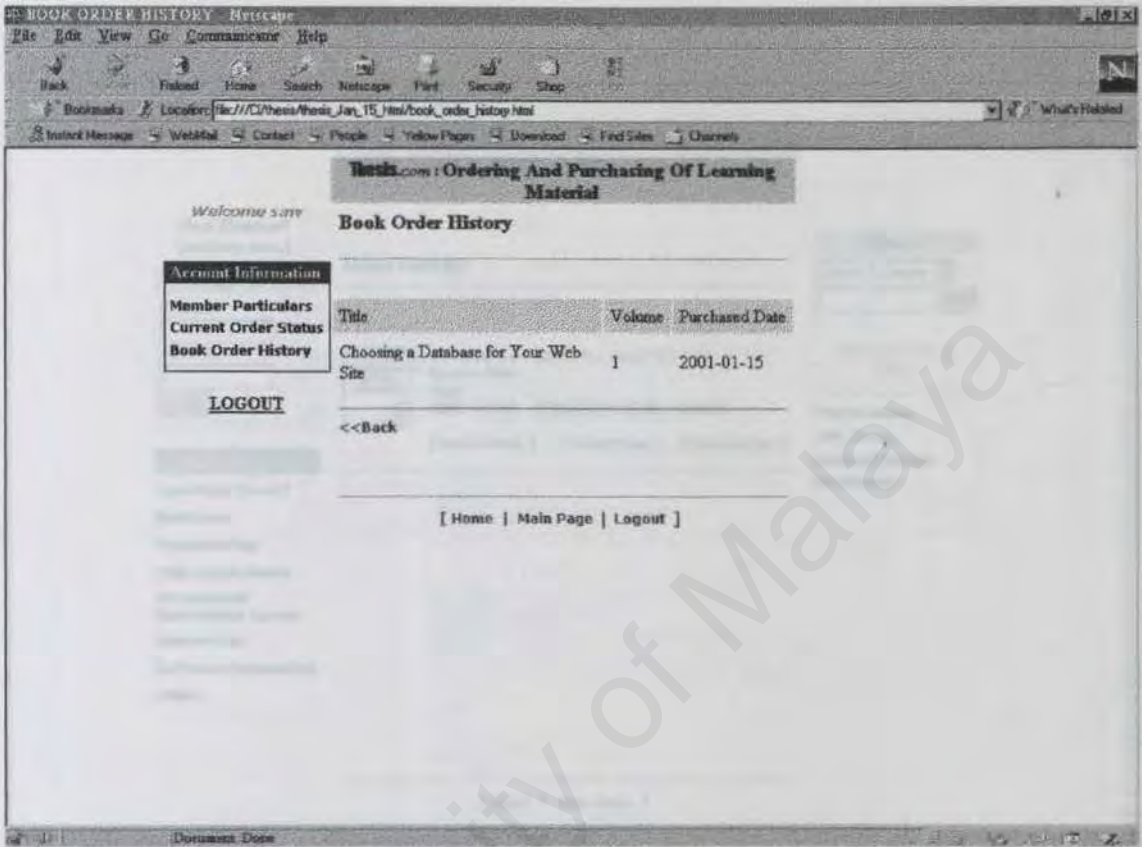
Edit Member's Particulars Page



Member's Current Order Page

3. Main Page

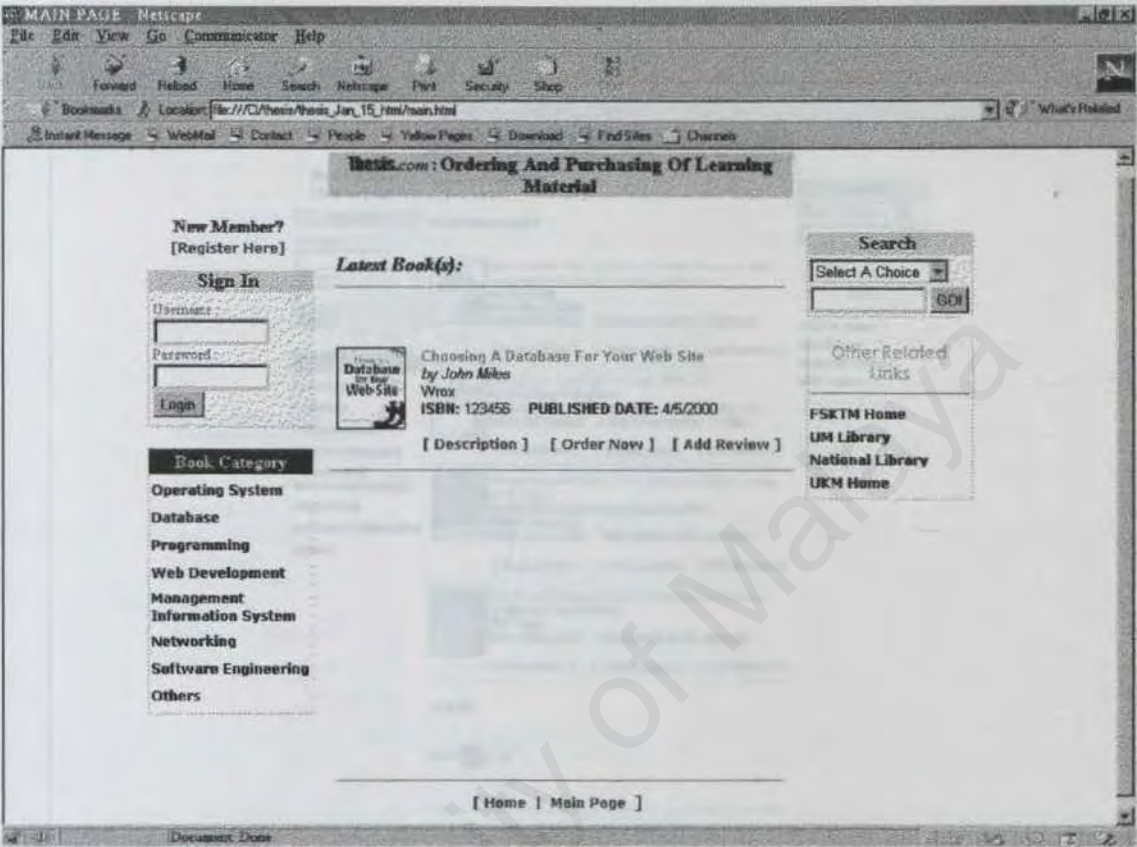
The main thing that will be displayed in this page is the latest offering. When the latest books will be displayed on. Anyone can also come into the main page through the site if she is not a registered member. The navigation bar on the left also allows anyone to register and also members to login. Besides that, members can also browse the site and look for their desired books within the book category.



Book Order History Page

3. Main Page

- The first thing that will be displayed in this page is the latest offering. Where the latest books will be displayed out. Anyone also can come into this page even though he or she is not a registered member. The navigation bar on the left also allows anyone to register and also members to login. Besides this, consumers can also browse the site and look for their desired books under the book category.

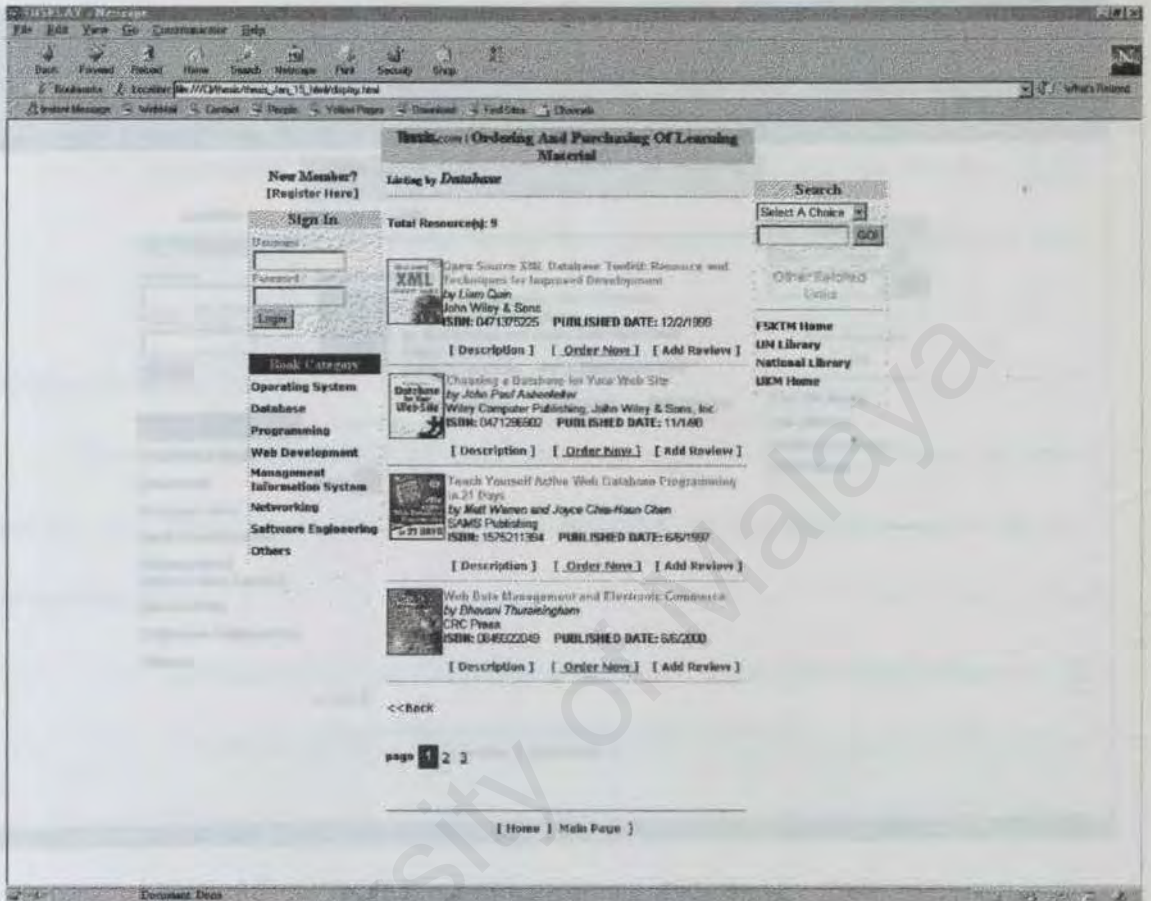


Consumer Main Page

Display The Latest Book Page

The navigation bar on the right allows consumers to click a specific book or the books that they are looking for. They can search for:

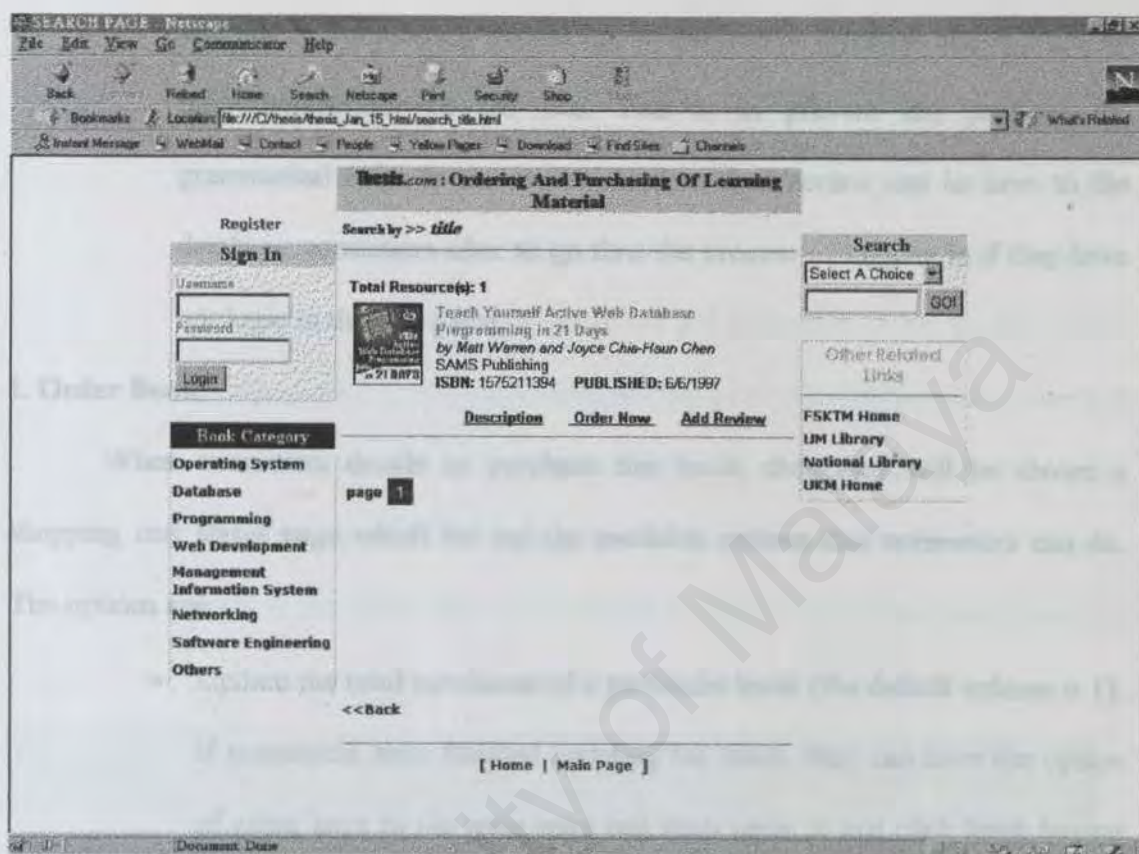
- All Books
- Title
- Author
- Publisher and
- ISBN



Display The Latest Book Page

The navigation bar on the right allows consumers to make a quick search on the books that they are looking for. They can search by:

- All Books
- Title
- Author
- Publisher and
- ISBN



Example Of Search By Title Page

Lastly, there is also the related links for consumers to check out on if they feel the need for a break while browsing this site. Each book that is listed out will give the consumer the option to:

- I. Order the book
- II. Read the description of the book
- III. Add he or her own review regarding about the book that they have bought previously. This option is to allow consumer to voice their pleasure or displeasure buying a particular. Each review sent by a registered consumer

will not be immediately posted up, it will first be screened and approve by the administrator of the site. This is to prevent any profanity or grammatical error in the review. Before their review can be save to the database, consumers after to go thru the process of logging in if they have not login in the first place.

I. Order Book

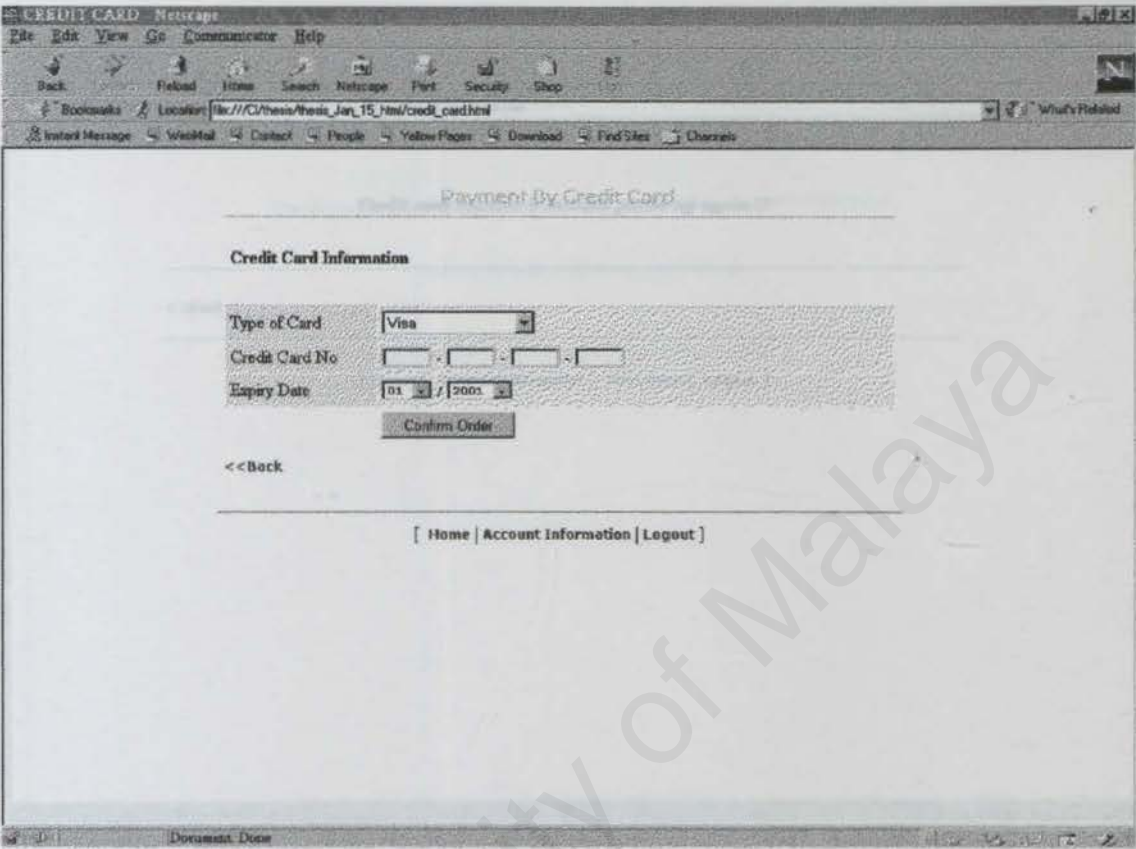
When consumers decide to purchase this book, then they will be shown a shopping cart status page which list out the available options that consumers can do. The options are:

- Update the total purchased of a particular book (the default volume is 1).
If consumers have finished updating the book, they can have the option of going back to the main page and shop again or just click finish buying to pay for the book. When consumers choose the option to shop some more and if by chance consumers wish to edit the shopping cart list again, a hyper link on the right of the navigation bar will direct them back to the shopping cart list.
- Delete the book from the shopping cart list option will immediately delete the book from the shopping cart. If the shopping cart list is empty then an empty alert page will be displayed.
- Finish buying option will immediately lead the consumer to a login page if they have not login else a fill in the payment method page will be listed out. If there is error while logging in, an error page will be

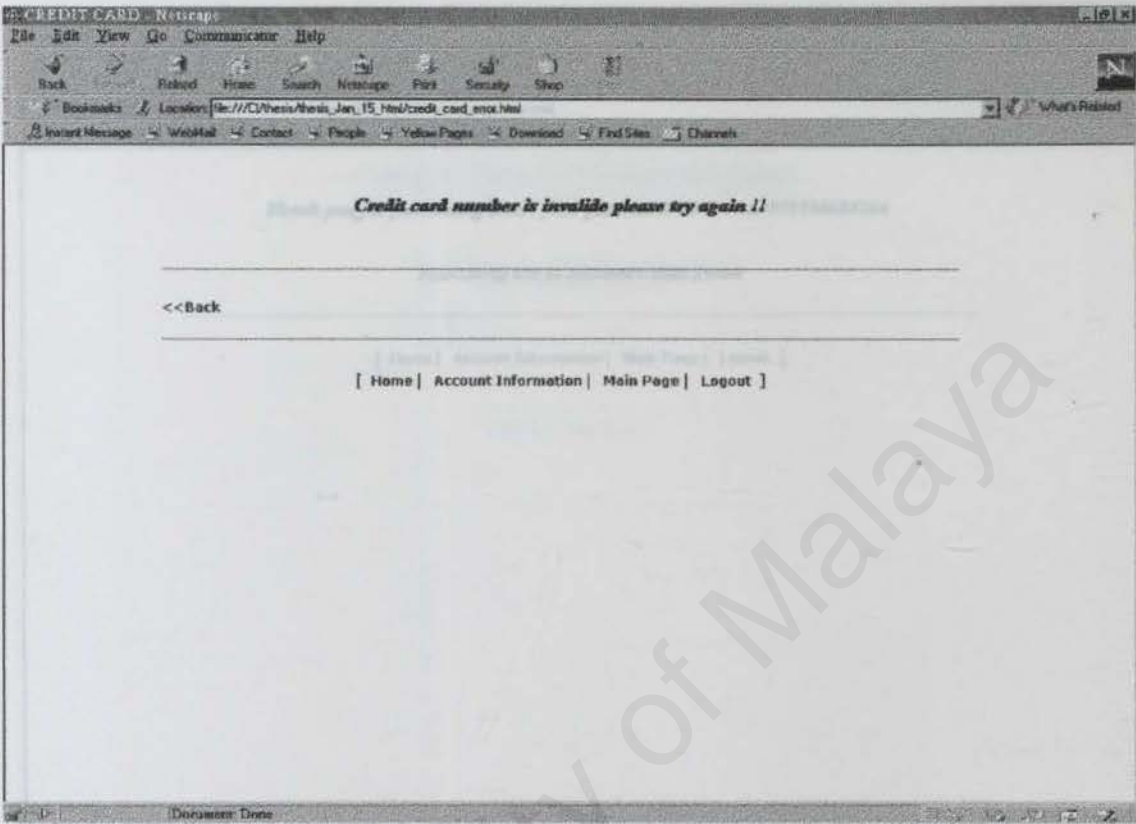
displayed out and it will also give the consumers the option to choose whether to continue relogin or cancel the order. During filling in the payment details, if there is any error arises, an error page will be prompt to the user else a page informing the consumers that their purchased are being processed and a purchased ID will be generated out for them. The purchased ID is used as a reference for both the administrator of the site and also consumers. It is used to verify the purchased that were make by the consumers. After finishing this, consumers have the choice to logout, back to the main page to shop again or check on their particulars such as their own personal details, current order status and order history.



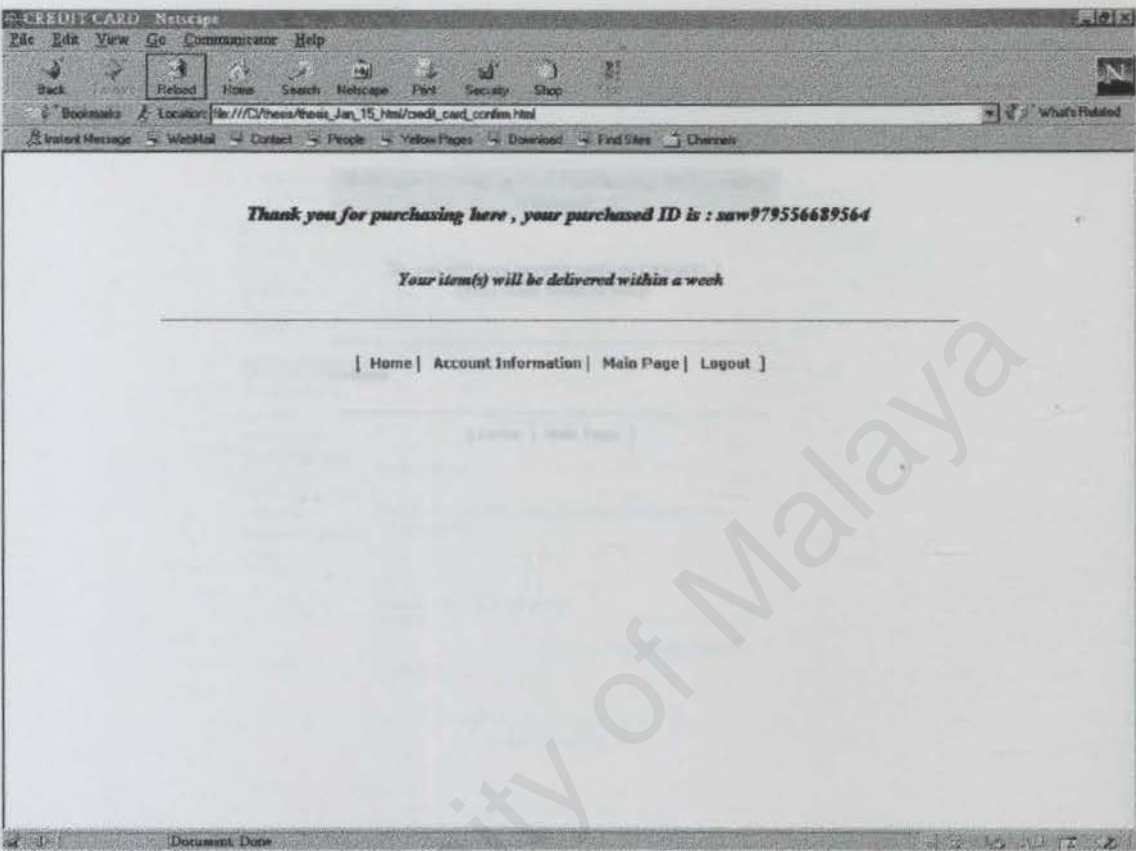
Shopping Cart Page



Payment Method Page



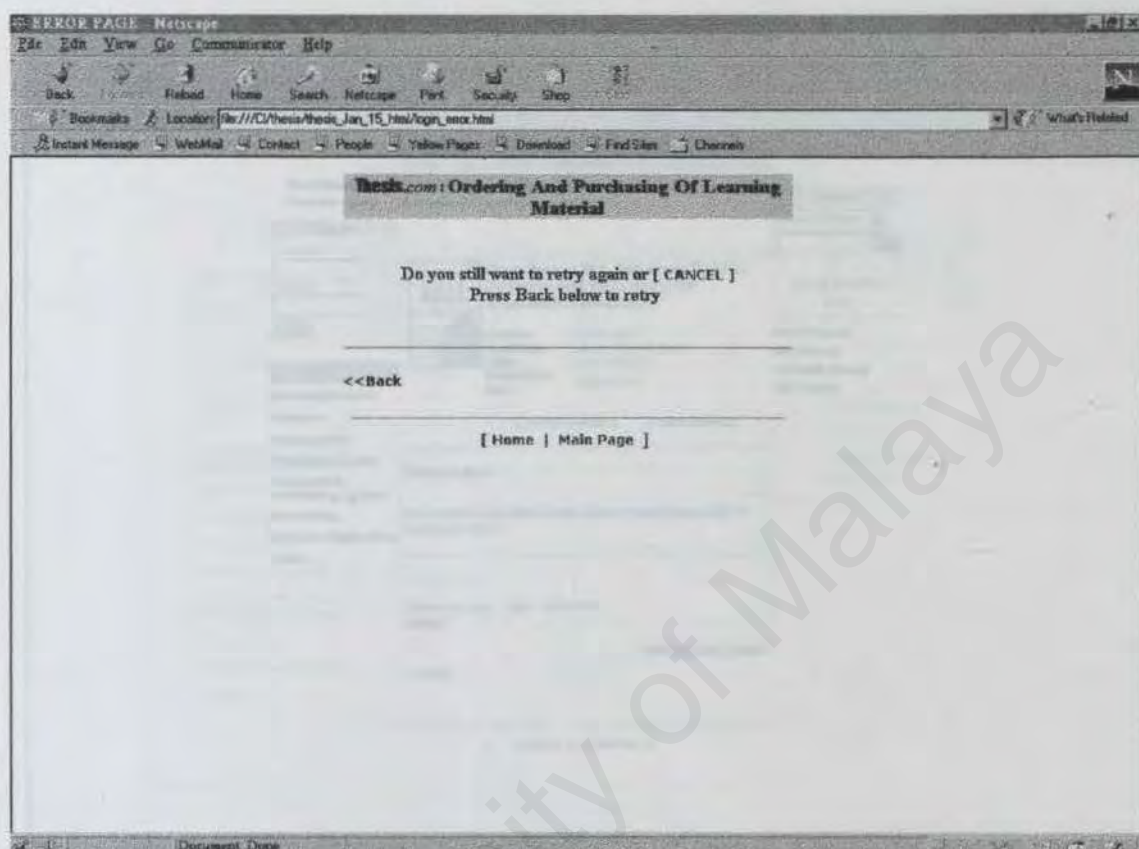
Error While Filling In Payment Details Page



Display Purchase ID Page

II. Read Book Description Page

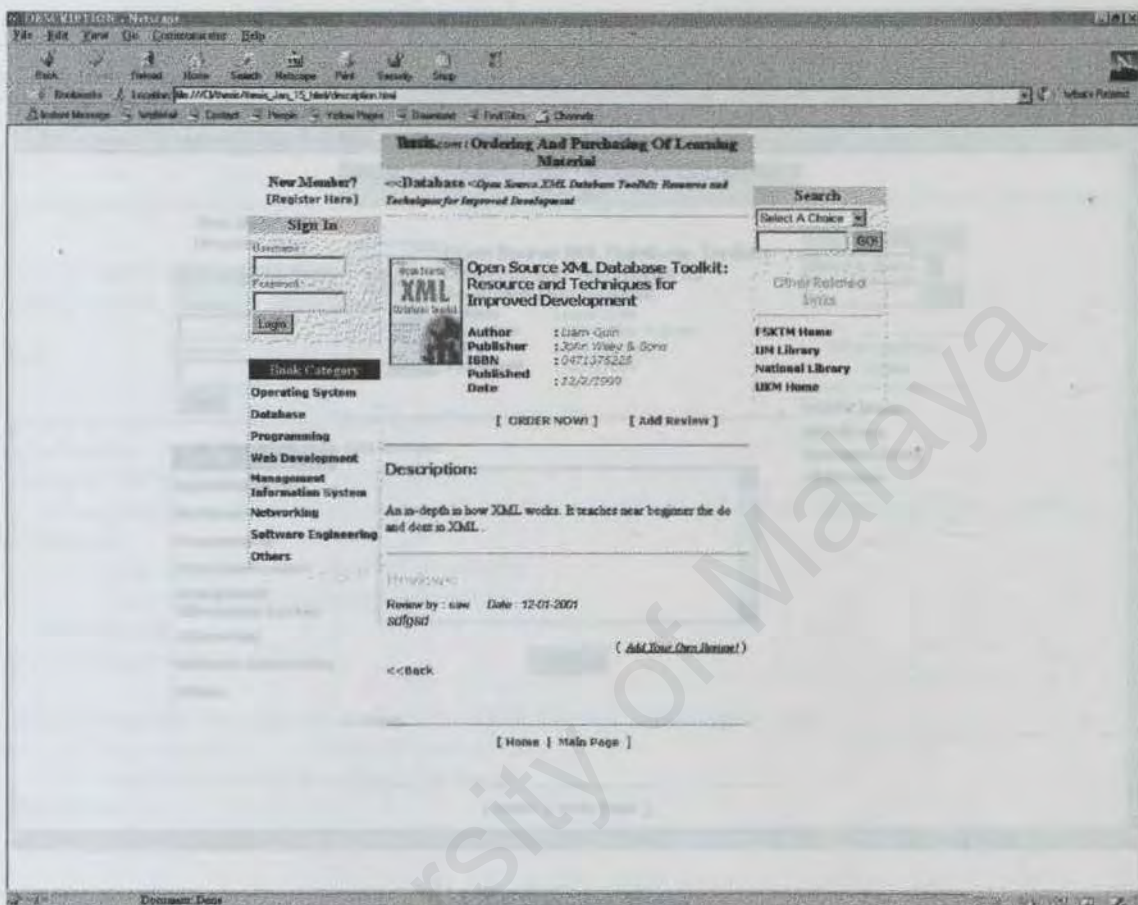
This page will display out the description of the particular that was chosen and also list out all the reviews that were posted out by other consumers. At the same time there is also the option of allowing them to add their own review.



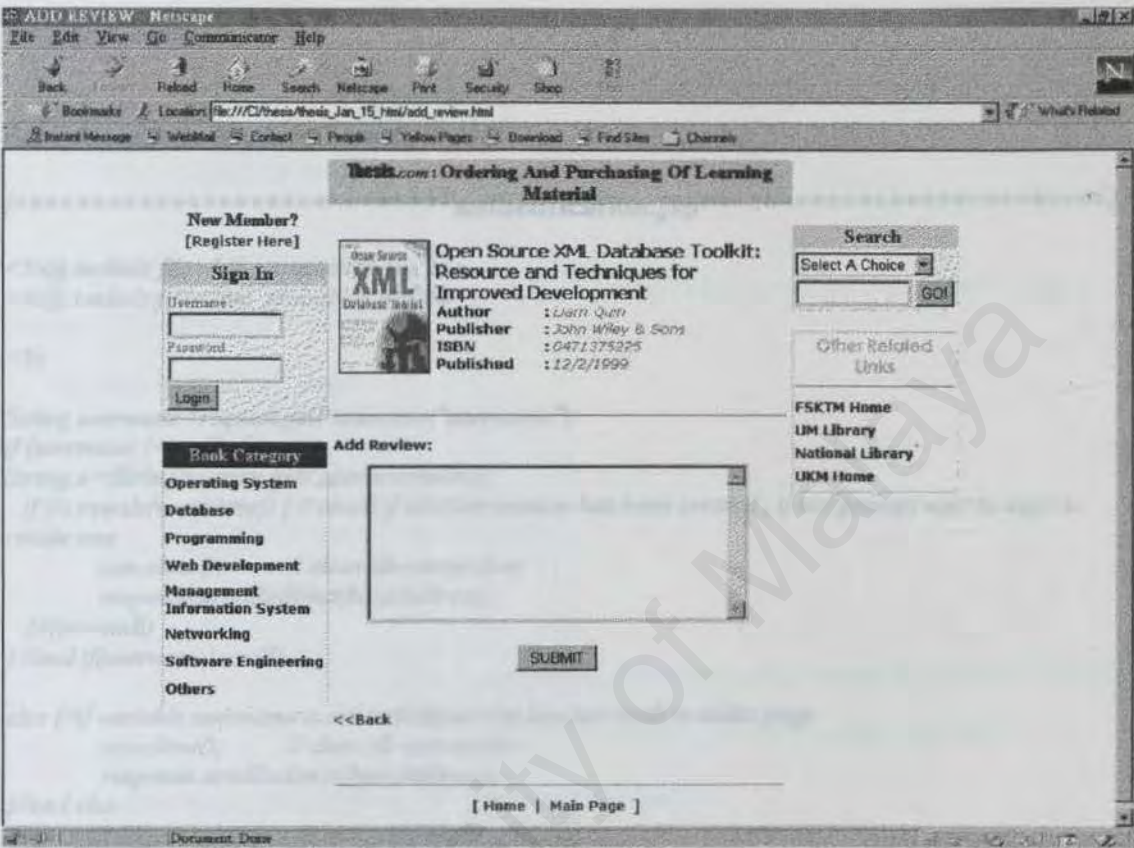
Option To Relogin Or Cancel Order Page

II. Read Book Description Page

This page will display out the description of the particular that was chosen and also list out all the reviews that were posted out by other consumers. At the same time there is also the option of allowing them to add their own review.



Book Description Page



Add Review Page

Sample Source Code

Sample Admin Module Source Code

```

/*****authentication.jsp*****/
<%@ include file="db_connection.jsp"%>
<%@ include file="inc_globalvar.jsp"%>
<%
String username=request.getParameter("username");
if (username != null) {
String s=(String)session.getValue(username);
if (!s.equals(username)) { // check if whether session has been created , if not prompt user to login to
create one
con.close(); // close db connection
response.sendRedirect(baseAddress);
} //(s==null)
} //end if(username!=null)

else { //if variable username is not initialized sent him/her back to index page
con.close(); // close db connection
response.sendRedirect(baseAddress);
} //end else
%>

```

Sample Consumer Module Source Code

```

/*****check_login.jsp*****/
<%@ include file="db_connection.jsp"%>
<%@ include file="inc_globalvar.jsp"%>
<%
int flag=0;
String username=request.getParameter("username"); //to store data pass from another page
String password=request.getParameter("password"); //to store data pass from another page
String passwd=""; // to store values from the database
String user=""; // to store values from the database

if (username != null && password != null) {

String order = (String)session.getValue("order");
String review = (String)session.getValue("review");
boolean ORDER=false;
boolean REVIEW=false;

if (order!=null) {

```



```

if (order!=null) {
    ORDER=true;
}
else if (review!=null) {
    REVIEW=true;
}

stmt=con.createStatement();
String sql = "select userID,password from members where userID='"+username+"' and
password=PASSWORD('"+password+"')";

rs = stmt.executeQuery(sql);

while (rs.next()) {
    user = rs.getString("userID");
    passwd = rs.getString("password");

    if (user.equals(username))
    {

        session.putValue("user",user); //create session for user who has login
        if (ORDER) {
            // redirect user back to credit card page

            response.sendRedirect(baseAddress+"credit_card.jsp");
        } //end if (ORDER)
        else if (REVIEW) {
            // redirect user back to insert review page

            response.sendRedirect(baseAddress+"insert_review.jsp");
        } //end else if (REVIEW)
        else // redirect user back to main page
            response.sendRedirect(baseAddress+"main.jsp");

        flag=1;
    } //end if (user.equals(username))
} //end while loop

// Close database connection , query statement and result set
%>
<%@ include file="db_close_connection.jsp"%>
<%
    if ( flag != 1 ) {
        response.sendRedirect(baseAddress+"error.jsp");
    } //end if ( flag != 1 )

} //end if ( username != null && password != null )
%>

```